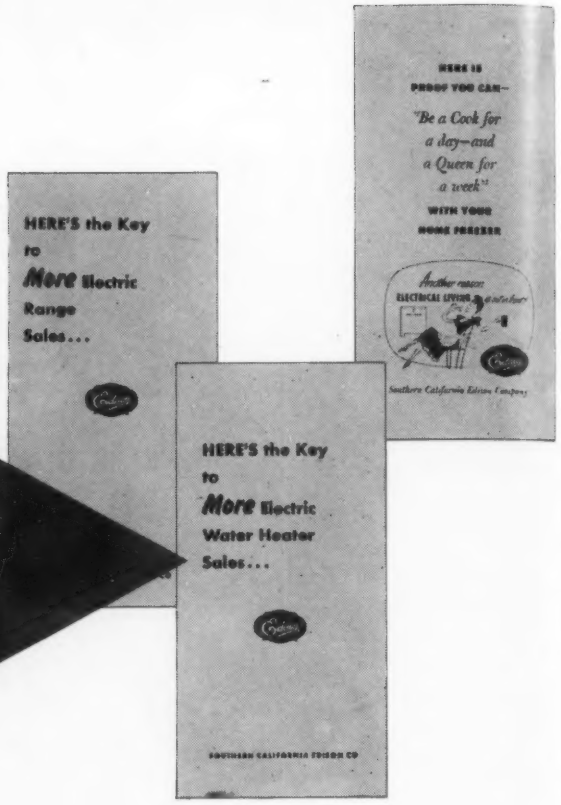
ELECTRICAL WEST

October 1948
25 cents

Industrial Section, Page 67
Appliances, Page 94

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

what's the point?



In personal contact with the buying public, this is increasingly evident: It takes *facts* to turn inquiries into sales. Today's appliance salesman is quite likely to resemble a whole group of quiz program contestants!

Generalizations—"new and improved," "more efficient," "cheaper to operate," "does more things better"—all of these are good only to a point.

What is that point? It is when the customer asks "Why?" and "How?"

That is the reason for these Edison appliance selling manuals, developed at the request and with the cooperation of appliance dealers. Pocket-size, unusually comprehensive, they are filled with facts about costs, capacities, installation and operation, together with suggested selling points.

As a part of Edison cooperation with dealers, these manuals are made available to salespeople in stores everywhere in Edison territory. They are proving invaluable—sales go more smoothly when the salesman can match answers to questions on any point, without hesitation.

SOUTHERN CALIFORNIA EDISON COMPANY

WE STOPPED THEIR BREATHING TO PROLONG THEIR LIFE!

On large tanks, Nitrile rubber gasket of circular cross-section is compressed as shown. Ring welded to tank keeps gasket in place—prevents too much compression.
On small tanks, Nitrile rubber gasket of square cross-section is compressed between rim of cover and deep-rolled flange on tank. Shown uncompressed.

In G-E Spirakore® transformers, Nitrile rubber gaskets—unharmed by oil, age, or operating temperatures—effectively seal out atmospheric air, moisture, and other contamination—thereby greatly prolonging the life of the insulating oil and consequently the units themselves. By redesigning the tanks, covers, handholes, and gaskets, we've made this sealing possible *and improved accessibility!*

Some years back,we sealed our power transformers completely. Now we've done it with all liquid-immersed, distribution transformers. We've stopped their breathing, too. We've made sealed tank construction available in all General Electric Spirakore transformers—from the smallest to the largest.

Other Improvements

Yet sealed-tank construction is only one of the improvements you get with General Electric distribution transformers. You get Spirakore design —for great savings in size and weight. You get improved impulse strength. You even get a new and better baked synthetic-resin paint, which reduces maintenance costs.

Today—as ten years ago when lighter, smaller Spirakore transformers first made history—Spirakore still leads the field. It's the finest distribution transformer we have ever made, the finest you can buy. Ask for Bulletins GEA-4885 and GEA-4521. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GE Spirakore Transformers

GENERAL ELECTRIC

402-88

OCTOBER
1948

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity". Contents Copyright. Sixty-first year of publication.

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
James H. McGraw, Jr., Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — Joseph A. Robinson, Assistant Editor
John W. Otterson, Manager — John Cootz, Typography
R. A. Balzari, Publishing Counselor

IN NOVEMBER

Should the government build a transmission line to interchange Columbia River and Shasta Dam power? Such a line is being considered by the U. S. Bureau of Reclamation. Holland Houston, engineer of the Department of Public Works of the state of Washinigton, says "No" and tells why in an article that will appear in November.

Uskon, conducting rubber panel, is the latest in radiant space heating. First Western installation will be described with pictures and story. What happens when television comes to town? This live topic will be discussed from the sales and service angles based upon experience gained in Los Angeles and Salt Lake City, where television stations are operating.

Transporting a 25,000-kva. transformer up in the mountains will be shown in pictures. Lighting of high school football fields and the story of how an electrical contractor has set himself up for efficient handling of industrial wiring will be told.

Pictures will dramatize utility linemen rebuilding a transmission line while a brush fire is still raging. Included in the next issue will be a picture story showing extensive use of bus duct and other modern wiring methods in a new industrial plant.

Look, too, for the sales guide, the news letter and another installment on power factor correction.

CONTENTS

INDUSTRIAL

New Markets — New Industries 67
Columbia's New Sheet and Tin Mill 68
Steel Expands 72
Northwest Aluminum Is Big Business 73
Spectrograph for Quality Steel Control 74
More Nuts and Bolts 75
Plate Mill Conversion at Geneva 76
Portable Oil Well Driller 77

ENGINEERING

Centralized Control at Kern 79
Low Power Factor in Industrial Plants by W. C. King 81
AIEE Studies Load Growth Problems 82

WIRING

Inspectors Talk New Code Procedure 85
Commercial Building Rewiring by Harold Gerber 90

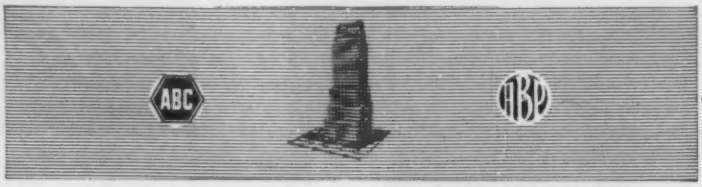
DEPARTMENTS

Associations 106
Bulletins 60
Editorials 92
Electra's Husband 64
News 130
New Products (other) 36
News 130
PCEA Panorama 118
Sales Guide 103
Sales Guide News Letter 99

Cover: SPARKLING TENSENESS—Open-hearth steel is poured into ingots at Columbia Steel's Pittsburg, Calif., plant. Photo by Columbia Steel Co.

ADVERTISING REPRESENTATIVES

Chicago (11) ..... W. B. Heaps, 520 N. Michigan Ave.
Cleveland (15) ..... Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (14) ..... W. D. Lanier, 621 S. Hope St., MI. 3691
New York (18) ..... John P. Eichorn, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, 68 Post St., DO. 2-4600



THE ELECTRICAL WEST EDITORIAL ADVISORY BOARD

UTILITIES. N. R. Sutherland, Vice-President in Charge of Public Relations and Sales, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President and Commercial Manager, the California Oregon Power Company, Medford; Frank McLaughlin, President, Puget Sound Power & Light Co., Seattle; J. H. Polhemus, President, Portland General Electric Company; W. C. Mullendore, President, Southern California Edison Company Ltd., Los Angeles. MANUFACTURERS: J. H. Pengilly, Executive Vice-President, Square D Company, Los Angeles; C. A. Dostal, Vice-President, Westinghouse Electric Corporation; A. S. Moody, Vice-President, General Electric Company, Portland. WHOLESALERS: A. H. Meyer, Leo J. Meyberg Co., San Francisco and Los Angeles; Harry C. Gerster, District Manager, General Electric Supply Corp., Seattle. CONTRACTORS: Teo L. Rosenberg, T. L. Rosenberg Co., Oakland; R. D. Horning, manager, Seattle Electrical Contractors Assn. DEALERS: K. L. Hampton, manager, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Sec'y-Mgr. Bureau of Radio and Electrical Appliances, San Diego California.

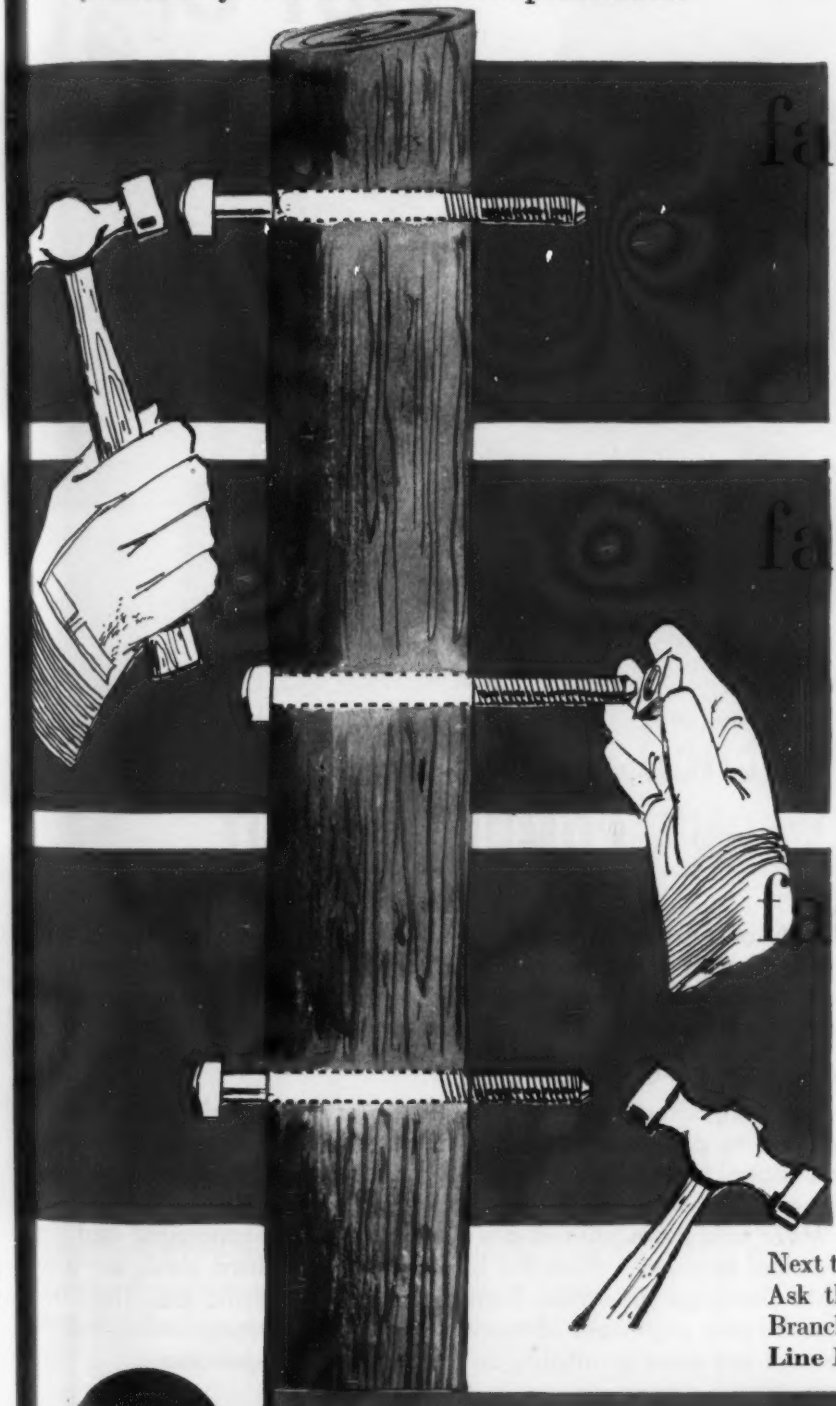
VOL. 101
NO. 4

ELECTRICAL WEST (with which is consolidated The Journal of Electricity). October 1948. Vol. 101, No. 4. Published monthly by McGraw-Hill Co. of Calif. Price 25 cents a copy. Publication office, 621 So. Hope St, Los Angeles 14, Calif. Executive and Circulation offices, Electrical West, 68 Post St., San Francisco 4, Calif. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the Act of March 3, 1879. Printed in U.S.A. Subscription rates—U. S., U. S Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Copyright, 1948, McGraw-Hill Company of California. All rights reserved.

You can speed up construction with

L-M Buffer Point Bolts

Buffer Points are standard on all L-M Bolts 6" and longer, including carriage bolts, machine bolts and double arming machine bolts, eye, double arming, and thimble eye bolts and many other standard and special bolts.



faster driving

tapered buffer point guides the bolt through the hole, with less friction

faster threading

buffer point guides the nut right onto the thread—no fumbling, no lost time

faster salvaging

hammering the point removes the bolt quickly—can't hurt the thread

Next time you order bolts, get L-M Buffer Point Bolts. Ask the L-M Field Engineer, call the nearest L-M Branch, or write, wire, or phone **Hardware Division, Line Material Company, Milwaukee 1, Wisconsin.**

LINE MATERIAL Pole Line Hardware

Complete Coordinated Equipment for All Distribution Requirements

A Package OUT OF THE BOOK

ORDERED AND INSTALLED AS ONE COMPLETE UNIT

Only one order and one set of specifications were needed for the equipment of the above substation. Transformers, switchgear, steel work, lightning arresters, disconnects—everything but the conduit, foundations and enclosing fence—was ordered and installed as a unit.

SAVED TIME—CUT COSTS

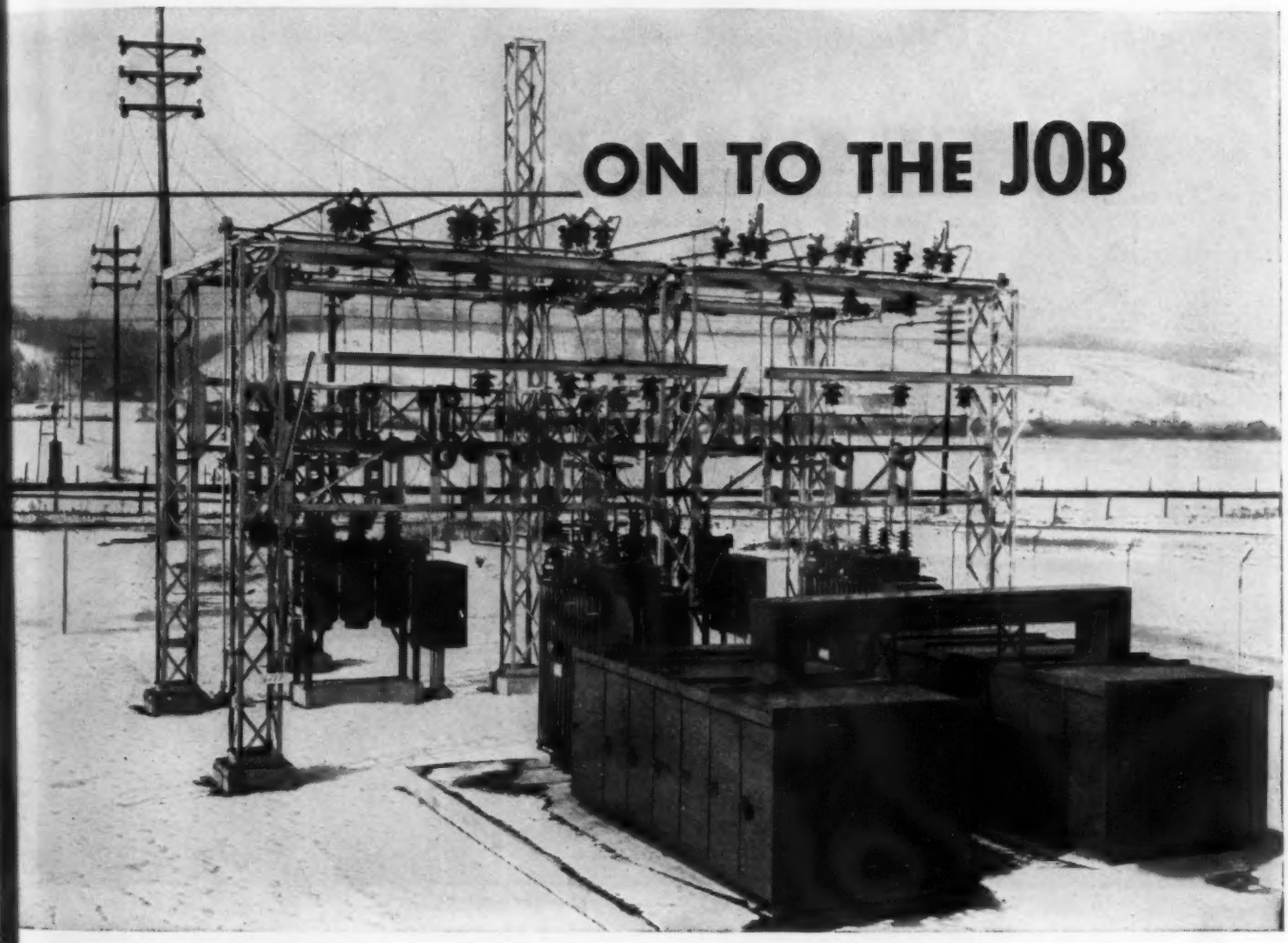
This eliminated months of costly "piecemeal" planning—made possible to place the order without delay. It made installation quick and easy too—the package substation was shipped in factory assembled sections as large as shipping facilities permitted.

More and more utilities are finding it easy, economical and highly practical to select—from the hundreds of standard designs—a complete package substation matched to each specific job. They find it frees system engineers of much detail work on components, lets them concentrate more profitably on over-all system operations.

A 'PROVED' PRACTICAL APPROACH

Two years ago G.E. introduced the "Package Substation" as one of the solutions to the difficult economic and manpower problems facing the electric utility industry. The unusual acceptance of the idea is indicated by the fact that over 500 of these complete package substations have been purchased by electric utilities since publication of our package substation bulletin (GEA-4500) two years ago.

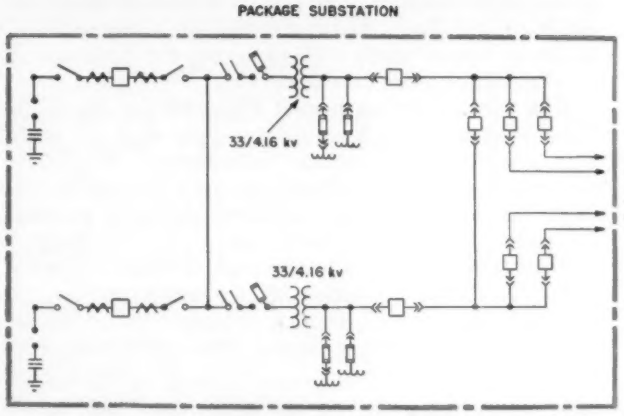
Substation . . .



VE TIME AND MONEY WITH THE *UNIT APPROACH*
GET THE COMPLETE SUBSTATION AS A *UNIT.*

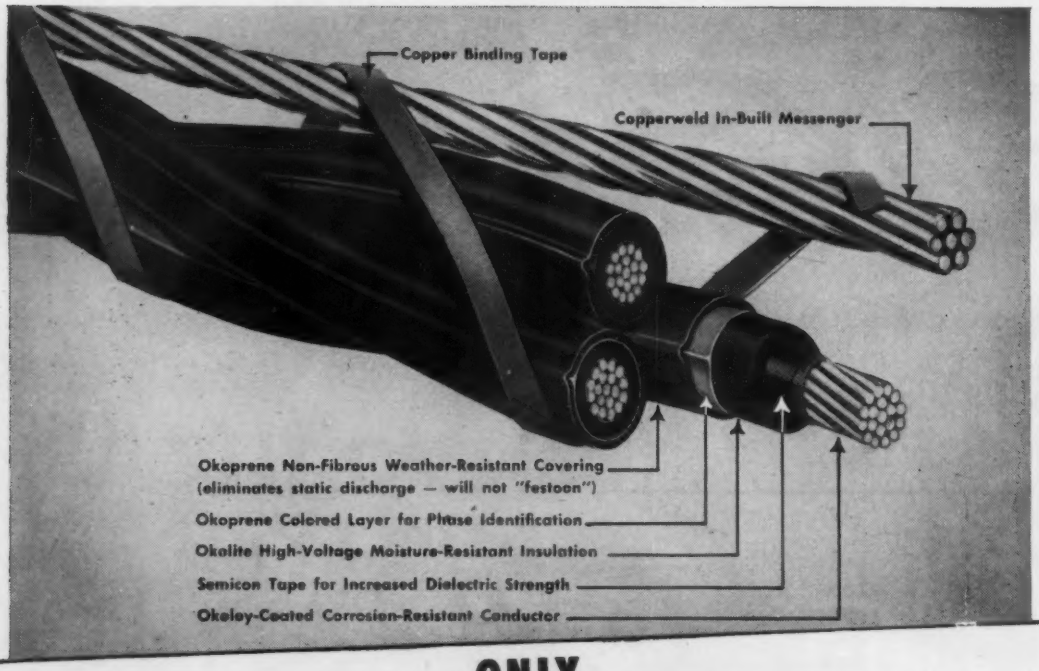
Thirty of the basic package substation arrangements e shown in GEA-4500 (left, above). Use it to investi- te the *unit approach* to your next substation applica- n. We think you'll be pleasantly surprised. Your G-E es representative will gladly provide a copy and p you all he can. *Apparatus Dept., General Electric mpany, Schenectady 5, N. Y.*

PACKAGE SUBSTATION

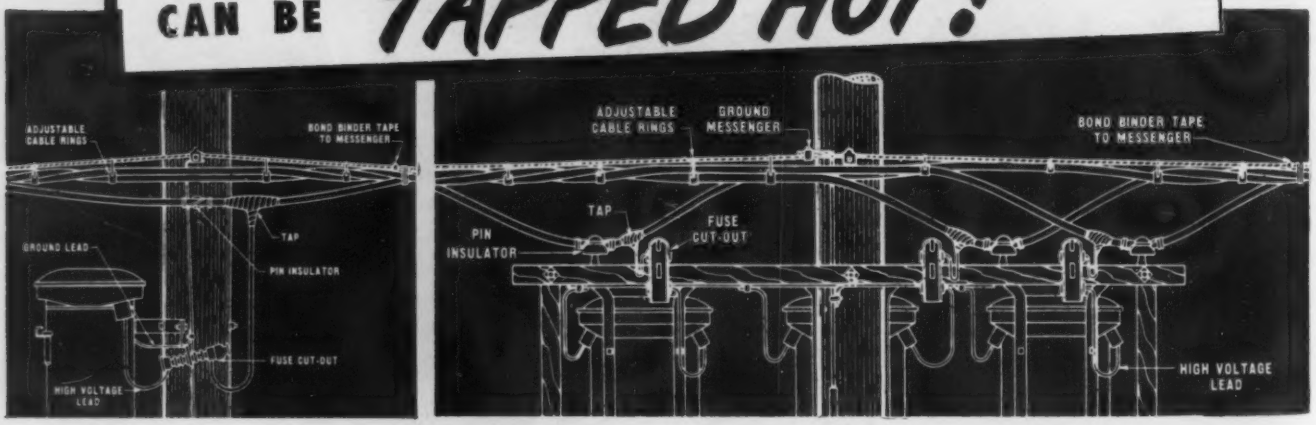


GENERAL ELECTRIC

321-56


Copper Binding Tape
Copperweld In-Built Messenger
Okoprene Non-Fibrous Weather-Resistant Covering
(eliminates static discharge — will not "festoon")
Okoprene Colored Layer for Phase Identification
Okolite High-Voltage Moisture-Resistant Insulation
Semicon Tape for Increased Dielectric Strength
Okoloy-Coated Corrosion-Resistant Conductor

ONLY OKOLITE-OKOPRENE SELF-SUPPORTING CABLE CAN BE *TAPPED HOT!*



A tested *type* of aerial construction . . . a cable *design* you get only with Okonite . . . a cable *assembly* that's also unique with Okonite . . . all add up to the only cable that can be tapped "hot". And as the diagrams above indicate, it can be tapped *easily* without taking the cable out of service or cutting the conductor.

The *type* is service-proved Okolite-Okoprene Self-Supporting with inbuilt messenger—light, compact, easily and inexpensively installable in congested areas. The *design* is Okonite's own Line-Tap, made possible by the combination of insulated conductors protected by non-conducting Okoprene and their *assembly* by the "Dualay" method. This patented Okonite method* makes tapping easier by readier separation of conductors. It prevents longitudinal tension stresses. It is now standard for all Okolite-Okoprene self-supporting cable rated up to 5 KV whose individual insulated conductors are not over 1.1".

Features in the cable itself contribute to its failure-free long life — Okoloy conductor coating which is copper-free . . . Semicon tape (on all cables operated at more than 2000 volts between phases) . . . moisture, ozone and heat resistant Okolite, an insulation which has proved its stable electrical characteristics in cable operation at voltages as high as 38 KV . . . Okoprene, the tough, non-flammable covering which is unaffected by exposure to sunlight, weather, chemicals and fumes and which does not develop harmful static discharge at voltages up to 5 KV between phases.

A 52-page book gives full engineering data on Okolite-Okoprene Self-Supporting Aerial Cable including designs for voltages above 5 KV. A copy will be sent to electrical engineers and utility executives who write for it, addressing The Okonite Company, Passaic, New Jersey.

*U. S. Pat. No. 2,430,378

6815

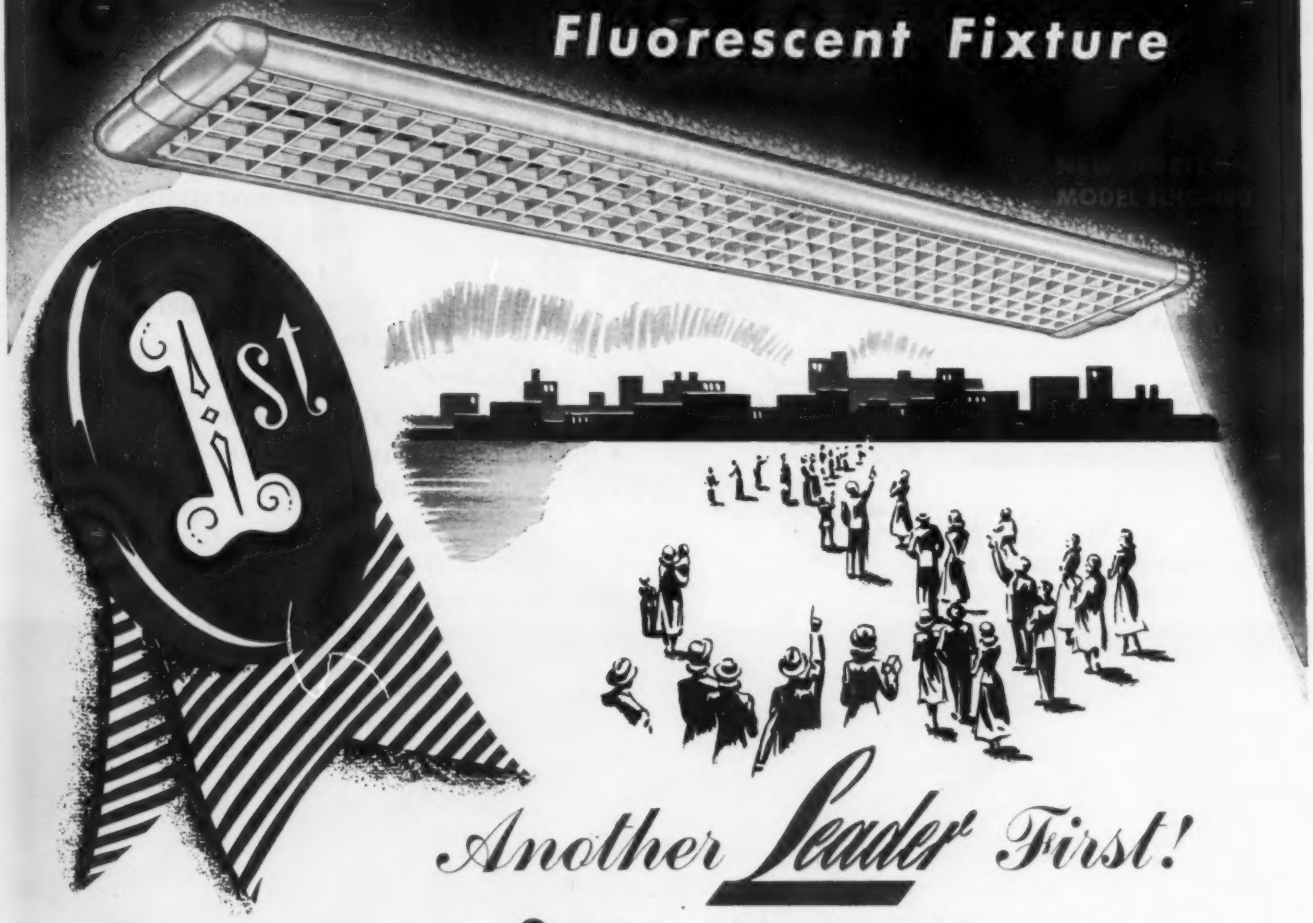
OKONITE insulated wires and cables

SINCE 1878

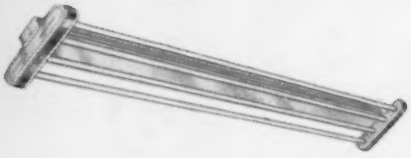
THE BEST CABLE IS YOUR BEST POLICY

Leader NEW HORIZON

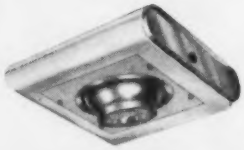
Fluorescent Fixture



Another Leader First!



Leader NEW HORIZON Open Type Fixture, especially designed for mass lighting of large commercial establishments.



The NEW HORIZON Incandescent Spotlight. Excellent for highlighting displays. Available for corner or center installations.

FIRST successfully-engineered, fully-proven, Slimline-tube lighting fixture.

FIRST on the drafting board; first into production; first into the testing laboratory; and first on the market!

FIRST in a beautiful fixture ensemble of gleaming metal and plastic. First to achieve this practical result: Maximum diffusion of horizontally-directed light; muffled glare with a minimum of light interference.

NEW HORIZON, Model NHC-480 (as illustrated above) has drawn aluminum end-caps. Newly-designed, destaticized moulded-PLASTIC lightweight louvers (will not warp or discolor). Fully guaranteed. New-style tubular-PLASTIC translucent side panels . . . Slimline (instant-start) tubes designed for *four* eight-foot tubes: F96-T-8. Also for *two* eight-foot tubes: NHC-280.

Ask for complete mechanical details

LEADER ELECTRIC COMPANY

LEADER ELECTRIC COMPANY

Announcing

RESISTS ABRASION 30 TIMES AS LONG IN THE SCRATCH TEST

LASTS 24 TIMES LONGER IN THE HEAT AGING TEST

DOES NOT CRACK UNDER HIGH TEMPERATURES

IS MORE FLEXIBLE

WINDS EASIER

TAKES LESS SPACE THAN FIBROUS COVERED WIRE

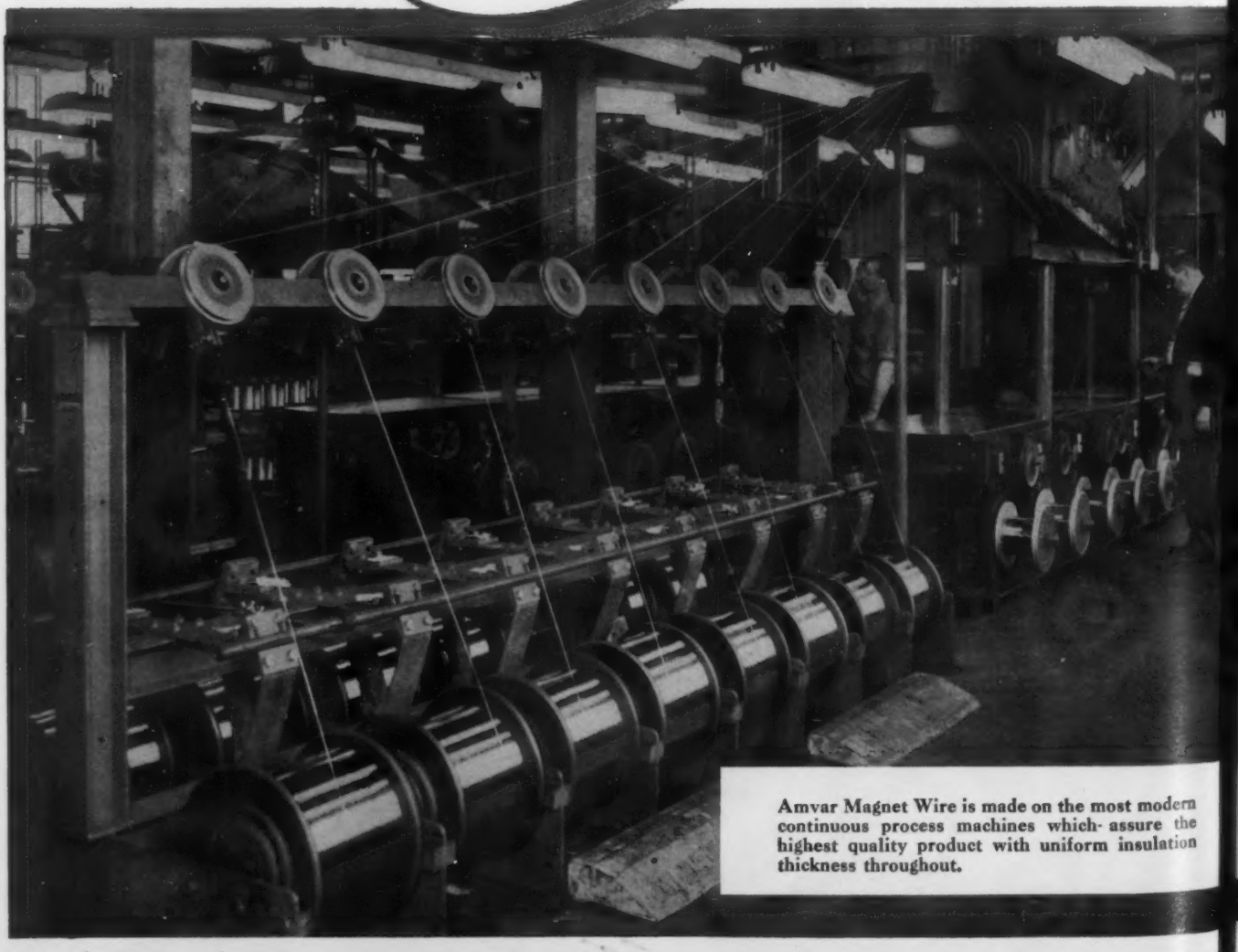
How AMVAR *is superior to conventional enameled magnet wire*

IS HIGHLY RESISTANT TO INSULATING VARNISH SOLVENTS

RESISTS MOISTURE BETTER IN SERVICE

HAS MORE RESISTANCE TO THERMOPLASTIC FLOW AT HIGH TEMPERATURE

SAVES COSTS BECAUSE COILS CAN BE MADE SMALLER REDUCING SIZE OF MACHINES



Amvar Magnet Wire is made on the most modern continuous process machines which assure the highest quality product with uniform insulation thickness throughout.

AMVAR... the finest magnet wire we have ever produced!

AMVAR Magnet Wire is so far superior to ordinary enameled magnet wire that it is necessary to compare them point by point to realize what a vast improvement has been made.

Although enameled wire has high dielectric strength and takes up little room, its mechanical properties leave much to be desired. Generally, a coating of cotton, paper or silk is needed to protect the enamel from chipping. These materials absorb water so they must be coated with insulating varnish to make them resistant to moisture. The final result is a stiff magnet wire, difficult to wind which takes up too much space.

The New Amvar Magnet Wire is coated with a film of polyvinal acetal synthetic resin. It retains the high dielectric strength and requires *much less space* than any of the fibrous coated enameled wires. The insulation is extremely tough, abrasion resistant and moisture resistant. It will not crack or chip even under long exposure to heat. Stretch an Amvar wire and the copper will break before the insulation.

Because of its better space factor, machines and equipment designed with Amvar can be made smaller. They cost less and give better, longer service.

Amvar, itself, is lower in first cost than the fibrous covered wire it replaces. You can wind more coils faster and the wires stay put in the coil.

In service, Amvar's freedom from cracking prevents trouble. It withstands prolonged heat up to 105°C., resists most solvents such as alcohol, toluol and naphtha.

Amvar is made on precision machines of the latest design. It can be furnished in round wire in sizes from No. 8 to 40 A.W.G. and in single to quadruple insulation thickness.

Mail the coupon for complete information and a sample of Amvar Wire.

Coating the copper wire with Amvar resin is a precision process which results in an extremely tough cover that does not crack or rupture in service.

AMERICAN STEEL & WIRE COMPANY
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Send coupon for FREE sample of AMVAR

American Steel and Wire Company
Room 402 Rockefeller Building
Cleveland 13, Ohio

Gentlemen:

Please send me more information and a free sample of Amvar Magnet Wire for test purposes.

Name.....

Position.....

Company.....

Address.....

USS AMVAR MAGNET WIRE
UNITED STATES STEEL

Which meets your system requirements?

coordinated substations?

For overhead subtransmission circuits

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MODERN EQUIPMENT FOR BETTER DISTRIBUTION SYSTEMS

. . . . unit substations?

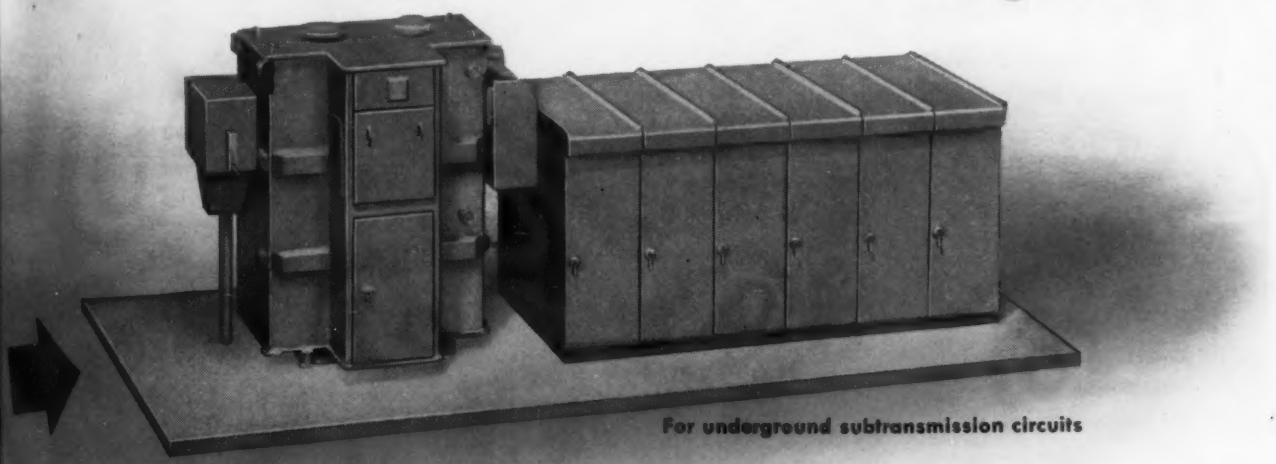
Today, *modern* substations for any system requirement may be purchased in two basic forms . . . as *Unit Substations* or *Coordinated Substations* . . . both supplied by Westinghouse.

Westinghouse helped introduce the *Unit Substation.* This type of substation is designed, built, tested and shipped complete . . . ready for connection to your system. Briefly, a *Unit Substation* consists of a transformer, and the necessary switchgear, combined to form an articulated unit to which the subtransmission and primary feeder circuits can be directly connected.

The *Coordinated Substation* consists of one or more *Unit Substations* with complete overhead terminating structure and any necessary terminating facilities. This equipment is shipped in easily-installed, factory-assembled and prefabricated sections.

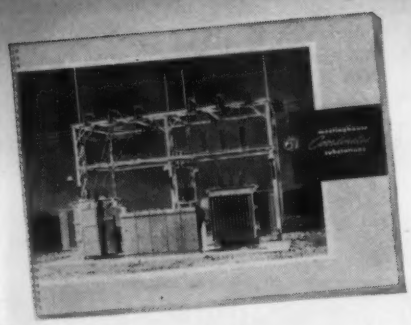
Westinghouse can supply a complete substation in *any* form . . . from incoming line to outgoing feeder . . . for *any* system. Whatever your power distribution requirements may be . . .

YOU CAN BE SURE IF IT'S Westinghouse



For underground subtransmission circuits

Here's the Complete Story ON WESTINGHOUSE COORDINATED SUBSTATIONS!



This 86-page book presents the standardized Westinghouse line of Coordinated Substations. Fact-filled pages of photographs and line diagrams give you complete information on all types . . . covering all basic requirements from the simplest to the more involved types of distribution substations.

To get your copy, call your nearest Westinghouse office. Ask for booklet B-4061 or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

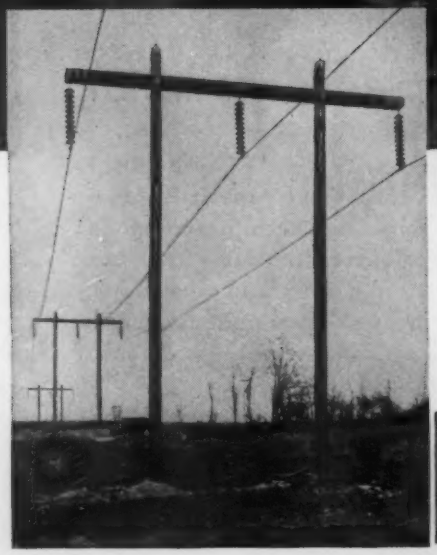
J-97132

BTC FORGED STEEL CLAMPS and FITTINGS Used on Important TRANSMISSION LINES

The transmission lines of the Osage Development of the Union Electric Company of Missouri, constructed by the Stone & Webster Engineering Corporation, were built in 1930 using BTC conductor and ground wire clamps and hardware.

Seventeen years of dependable service for this important transmission line development attest to sound engineering and good materials. For transmission line design, specify BTC Forged Steel Line Hardware.

Sold only through your insulator manufacturer



Above: The 119.5-mile Osage-Rivermines Line with steel towers and hinged wood cross-arms carrying 250,000 cm. copper conductor, 138 kv., and 7/16" Siemens Martin galvanized steel ground wire.

Left: The Osage-Page Line covers 135.5 miles with wooden "H" frame structures carrying 336,400 cm. A. C. S. R. conductor, 138 kv., and 7/16" S.M. galvanized steel ground wire.

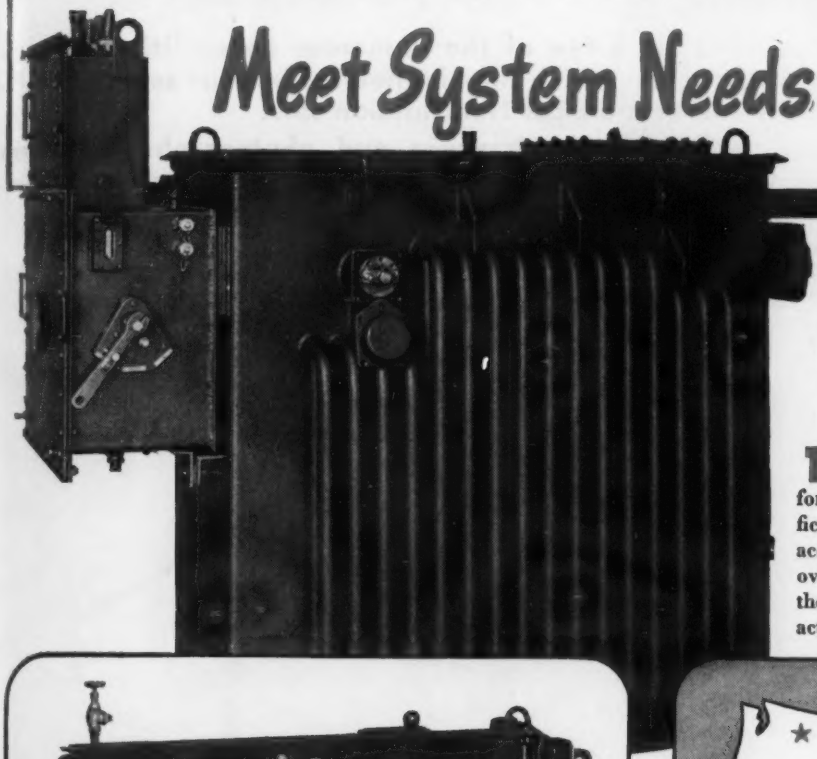
7200 SERIES

THE BREWER-TITCHENER CORPORATION

CORTLAND, NEW YORK

Allis-Chalmers Improved Network Transformers

Meet System Needs of U.S. Cities!

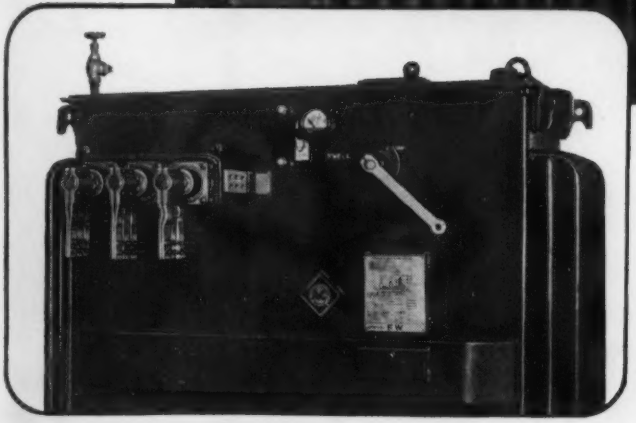


★ SMALLER SIZE, YET *NO* CUT IN RUGGED DESIGN!

★ L. V. THROAT FITS ANY *STANDARD* NETWORK PROTECTOR!

★ SUBWAY OR VAULT TYPE!

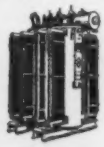
1 YES, THESE MODERN, IMPROVED transformers can be designed to meet *your* specifications—for size, electrical characteristics, accessories. And while they're smaller in overall size, there has been no reduction in the rugged mechanical and electrical characteristics typical of this transformer class.



2 THERMAL CAPACITIES ARE HIGH . . . operation is cool — even under the most severe load conditions. Allis-Chalmers' *time-proven* circular core and coil design withstands repeated heavy short circuit stresses. Universal low voltage throats permit you to "team" network protector of *your* choice with transformer you select.

3 IN NEW YORK, ILLINOIS, Alabama, Arkansas, Texas — from east coast to west — over ½ million kva of Allis-Chalmers network transformers are in service . . . operating *continuously* and *dependably*, supplying economical, uniform power to home, business and industry. For the *full* story see ALLIS-CHALMERS, MILWAUKEE. A 2296

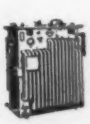
TRANSFORMERS ALLIS-CHALMERS BUILDS:



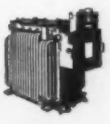
POWER — 500 kva to largest. Dry-type or liquid-filled.

⅝% STEP REGULATORS — single phase 2.4 to 15 kv; 3-phase 2.4 to 69 kv.

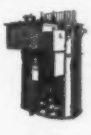
DISTRIBUTION — 1½ to 500 kva. Pole, vault, subway, substation and dry-types.



LOAD CENTER—100 to 2000 kva. Dry or liquid-filled. Indoor or outdoor.



NETWORK—150 to 1000 kva. Vault or subway types.



FURNACE — Indoor or outdoor. Water or self-cooled. All ratings.

INSTRUMENT — potential, current, and signal, indoor and outdoor types; outdoor metering. Standard voltages.

ALLIS·CHALMERS

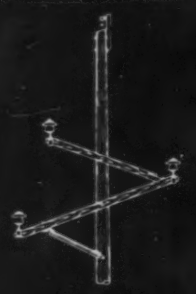
One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

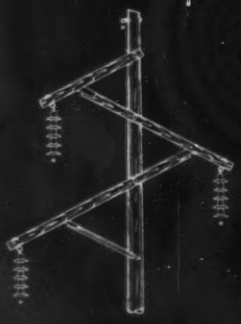
HUGHES *WISHBONE CONSTRUCTION*

Illustrated are a few of the numerous possibilities of wishbone construction which may be helpful in your selection of a practical and economical transmission line.

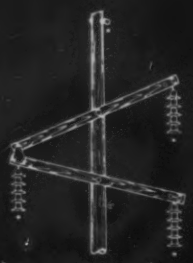
Cost analysis, scale drawings and photographs of actual installations may be obtained by consulting Hughes Engineering Department.



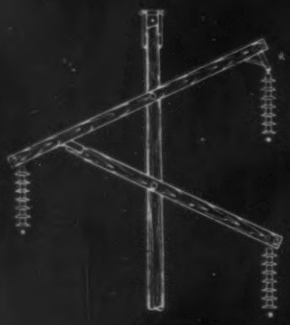
TYPE C-1752
33 kv. CONSTRUCTION



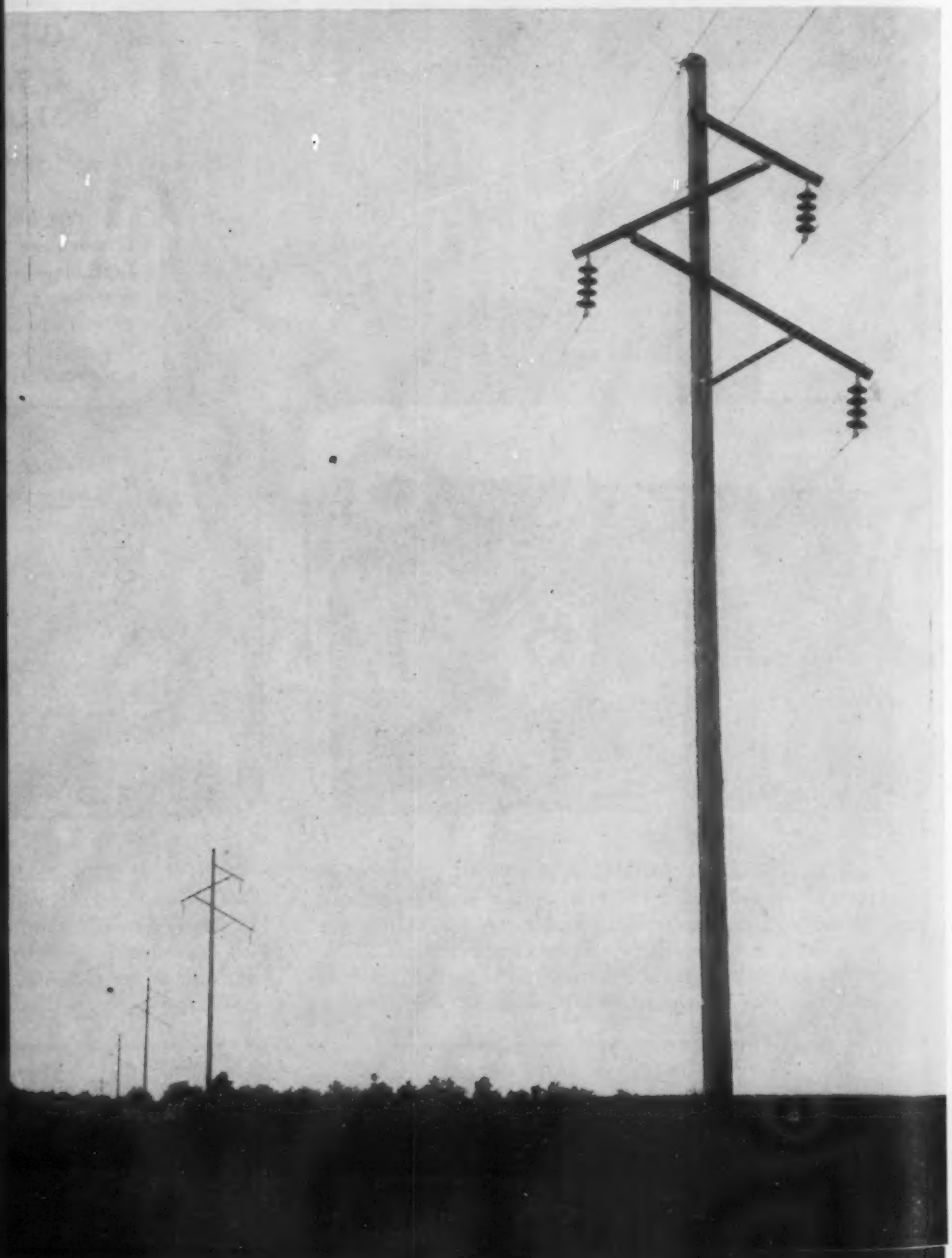
TYPE C-1080
69 kv. CONSTRUCTION



TYPE C-1072
69 kv. CONSTRUCTION



TYPE C-1238
115 kv. CONSTRUCTION



HUGHES BROTHERS
SEWARD NEBRASKA

Play Safe
Use SECURITY

For a Grip that STICKS

Pick Security Friction Tape

This strong, rubbery tape has high insulating properties and the tensile strength that's needed for the tougher jobs. Security has no pinholes—doesn't unravel when unwound from the roll. There isn't a better all-around electrical and general-purpose tape on the market. Safe, sure, long-lasting, Security is your handy man for any splicing job. Write to United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

A PRODUCT OF

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES
RUBBER COMPANY

2 NEW AUSTIN STEEL CHANNEL BOX HANGERS!

Nail between joists - Eliminate Notching

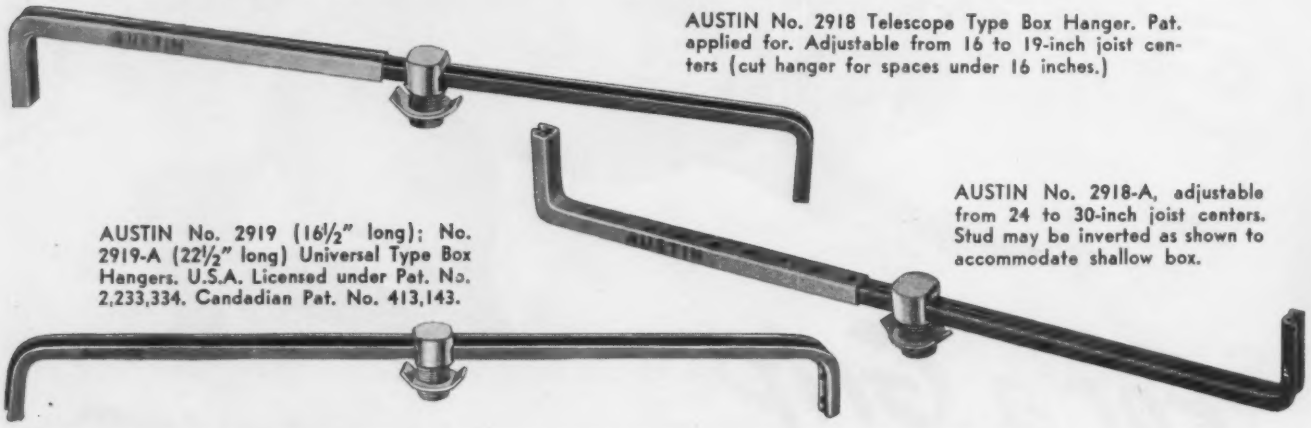
USE AS STRAIGHT, SHALLOW OFFSET OR DEEP OFFSET BOX HANGERS

One Instead of Three—Perfect Alignment—Stronger, Lighter, Easier to Handle!

Because these new AUSTIN Box Hangers are nailed between the joists at any desired height they can be used as Straight, Shallow Offset or Deep Offset Box Hangers.

No notching of joists is required as with the old conventional types to keep from bending, warping, or cracking surfacing material.

The steel channel (see cross-section illustration) provides greater strength and rigidity yet is much lighter in weight and therefore easier to handle.



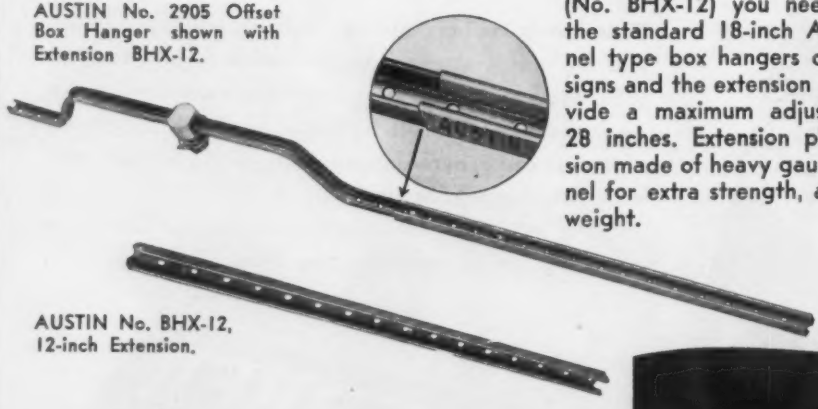
AUSTIN No. 2918 Telescope Type Box Hanger. Pat. applied for. Adjustable from 16 to 19-inch joist centers (cut hanger for spaces under 16 inches.)

AUSTIN No. 2919 (16½" long); No. 2919-A (22½" long) Universal Type Box Hangers. U.S.A. Licensed under Pat. No. 2,233,334. Candadian Pat. No. 413,143.

AUSTIN No. 2918-A, adjustable from 24 to 30-inch joist centers. Stud may be inverted as shown to accommodate shallow box.

KEEP BOX HANGER INVENTORIES LOW WITH AUSTIN'S NEW SLEEVE EXTENSION PIECE!

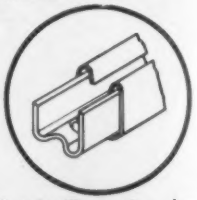
AUSTIN No. 2905 Offset Box Hanger shown with Extension BHX-12.



With AUSTIN'S new 12-inch Sleeve Type Box Hanger Extension Piece (No. BHX-12) you need stock only the standard 18-inch AUSTIN channel type box hangers of various designs and the extension piece, to provide a maximum adjustment up to 28 inches. Extension piece is precision made of heavy gauge steel channel for extra strength, and is light in weight.

AUSTIN No. BHX-12, 12-inch Extension.

Cross-section view of Steel Channel Box Hanger within Extension Piece.



Sketch illustrating how Extension Piece slides over Box Hanger end.

WE SELL EXCLUSIVELY THROUGH WHOLESALERS

The M. B. Austin Company

NORTHBROOK, ILLINOIS

YOU CAN BE SURE..IF IT'S Westinghouse

PICTURE OF A MOTOR 1400 FEET LONG

Suppose you were the Navy . . . and you had an idea that there must be some way to make an earth-bound electric motor help send a jet-propelled plane off the ground . . . quicker.

You'd go, wouldn't you, to the people who know most about motors?

This strange-looking device is what the Navy received as a Westinghouse solution to their problem.

It looks more like a railroad track than an electric motor. But it really *is* a motor.

It is 1400 feet long. It lies perfectly flat, never turns, has no shaft. But it works. It even has a name: the Electropult.

It takes a plane at standstill, whooshes it along for several hundred feet . . . and sends it into the air at 117 miles per hour.

Another example of Westinghouse engineering with that touch of sureness that you can always depend upon.

MAKER OF THE BROADEST LINE OF ELECTRICAL EQUIPMENT

Life-Line

SMASHING IMPACT caused by dropping this Life-Line motor four feet onto hard concrete pavement failed to do more than mar the finish

TERRIFIC PUNISHMENT PROVES STRENGTH OF INDUSTRY'S NEW ALL-STEEL MOTOR!

Motors seldom have to withstand dropping onto concrete—but they do meet constant stresses and unexpected shocks on most jobs in industry.

The fact that Life-Line motors can withstand such extreme examples of abuse is one reason for the startling records of more than a quarter-million now in service—a record six times better than that of any other motor design built by Westinghouse in its 58 years of motor manufacture.

The heavy steel "barrel" frame and "bridge-truss" foot construction has given the motor a rigid, yet resilient structure. Other important reasons are pre-lubricated bearings, new electrical strength, reduced space and weight. New streamline design blends with modern machinery.

Get the facts. Immediate delivery on standard and near-standard motors from 1 to 15 hp, in dripproof, splashproof and totally-enclosed types; specials available on short shipment. Life-Line design is rapidly being carried through larger sizes. Check your nearest Westinghouse office, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania.

I-21454-A

STEEL STRENGTH starts with heavy rolled plate which form Life-Line frame. Brackets and feet are heavy steel. Clampin bars, plates, bearing hubs, even conduit boxes are stee

Westinghouse

PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

Life-Line motors

Made in the WEST for the WEST

Powerful argument for men who buy cable...

KERITE lasts a long, long time . . . stands up well under most any conditions of temperature, weather, moisture, etc. . . . is good security against service outages . . . saves you money.

In short, Kerite makes your cable dollars go farther. *That,* we think, is a powerful argument for anyone who buys cable.

We can back it up with other powerful arguments, too. For instance—we can show you samples of Kerite cable more than 60 years old that are still mechanically and electrically in first-class condition. And we can point out that the same wonderful ingredient—Kerite—is used in the cable we make today as was used in that cable which has stood up so well.

And we might mention that no matter how old a company may be, it has to stay young to merit the continued business of astute buyers.

These powerful arguments—we think—will demonstrate why Kerite cable assures you of low cost per year. When you buy Kerite, the facts will back up your judgment—and the performance will bear it out. The Kerite Company, 30 Church Street, New York 7, N. Y.

Kerite Insulation—Your Cable's Best Life Insurance

DAYS KERITE

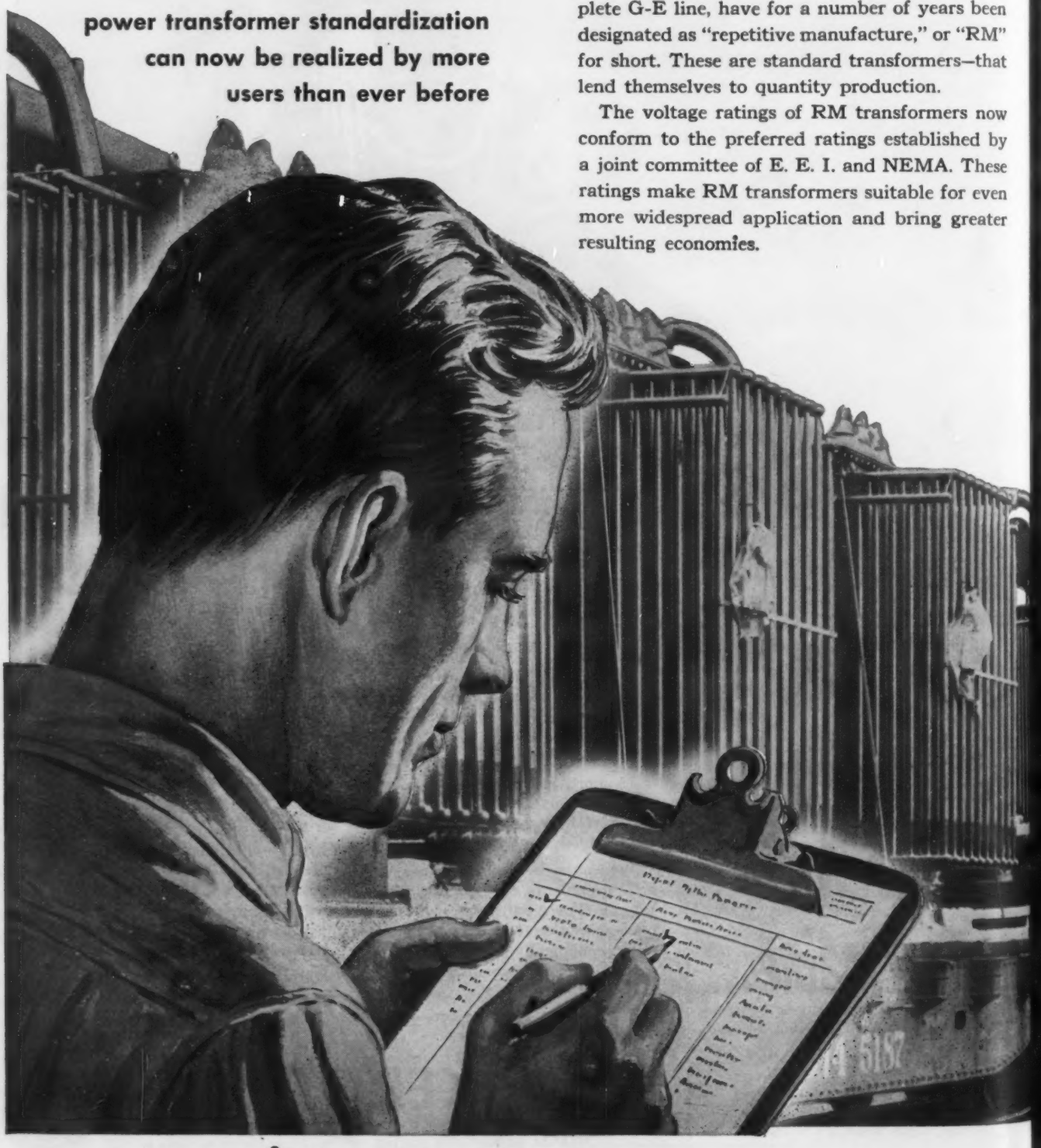
KERITE CABLE

Now . . . "RM" Power Transformers have new E.E.I.–NEMA Voltage Ratings

The benefits of power transformer standardization can now be realized by more users than ever before

Certain G-E power transformers, within the complete G-E line, have for a number of years been designated as "repetitive manufacture," or "RM" for short. These are standard transformers—that lend themselves to quantity production.

The voltage ratings of RM transformers now conform to the preferred ratings established by a joint committee of E. E. I. and NEMA. These ratings make RM transformers suitable for even more widespread application and bring greater resulting economies.



HERE IS A TABULATION OF THE NEW RM RATINGS:

SINGLE PHASE 60 CYCLE		SELF-COOLED KVA RATINGS									
		667	833	1000	1250	1667	2000	2500	3333	4000	5000
		SELF-COOLED FORCED-AIR-COOLED KVA RATINGS									
High-voltage Ratings	Low-voltage Ratings	667/ 767	833/ 958	1000/ 1150	1250/ 1437	1667/ 1917	2000/ 2300	2500/ 2875	3333/ 4167	4000/ 5000	5000/ 6250
2400/4160Y	480, 600										
4800/8320Y	480, 600 2400/4160Y 2520/4360Y										
6900/11950Y 7200/12470Y 7620/13200Y 12000△ 13200△ 14400△	480, 600										
	2400/4160Y 2520/4360Y 4600/8320Y 5040/8720Y 6900/11950Y										
22900△ 26400△ 34400△ 43800△ 67000△	2400/4160Y 2620/4360Y 4800/8320Y 5040/8720Y										
	6900/11950Y 7200/12470Y 7560/13090Y 7620/13200Y 7980/13800Y 12000, 12600 13200, 14400										

NEW RM LISTINGS

Because RM transformers cover the more popular ratings, and are available with the most popular types of terminals and accessories, they can be built to standard designs. Less engineering and drafting are required, and the resulting economies are passed on to you. And—because we expect the new RM listings to be even more popular than in the past, the economies gained from larger quantity production are being passed on to you by even more favorable prices as compared with "specials."

Faster Delivery

Besides the reduction in prices, RM transformers can be delivered anywhere from six to ten months faster than specials. This is made possible by the saving in time for engineering, drafting and manufacturing.

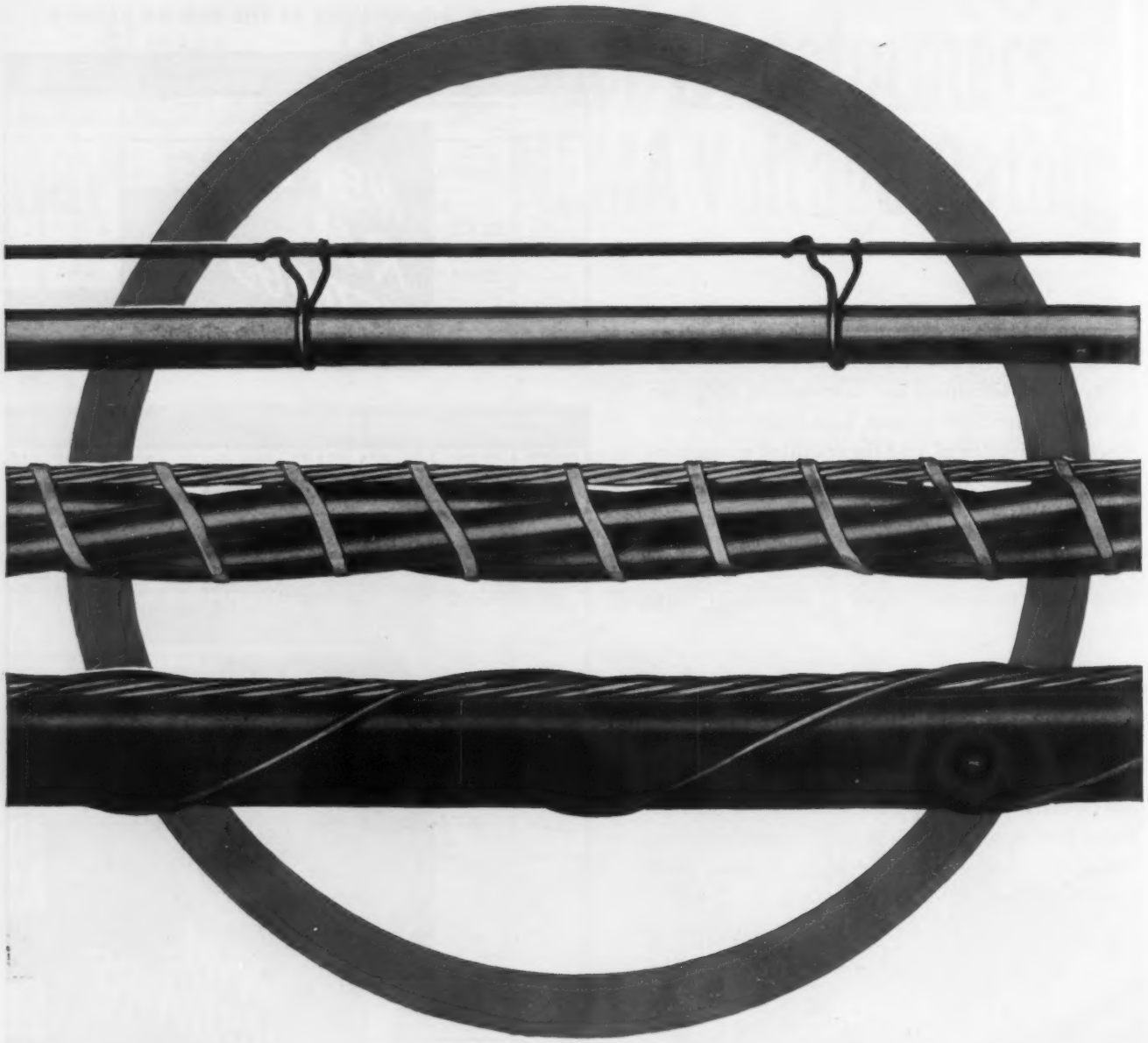
THREE PHASE 60 CYCLE		SELF-COOLED KVA RATINGS									
		750	1000	1500	2000	2500	3000	3750	5000	6000	7500	10000
		SELF-COOLED FORCED-AIR-COOLED KVA RATINGS										
High-voltage Ratings	Low-voltage† Ratings	750/ 862	1000/ 1150	1500/ 1725	2000/ 2300	2500/ 2875	3000/ 3650	3750/ 4687	5000/ 6250	6000/ 7500	7500/ 9375	10000/ 12500
2400△	208Y/120, 240											
	480, 600											
	480Y/277											
4160Y 4800△	240											
	480, 600											
4160△ 4800△	208Y/120											
	480Y/277											
6900△ 7200△	208Y/120, 240											
	480, 600											
	480Y/277											
	2400, 2520 4160Y, 4360Y 4800, 5040											
8320Y	240											
	480, 600											
	2400, 2520 4800, 5040											
12000△ 13200△ 14400△	208Y/120, 240											
	480, 600											
	480Y/277											
	2400, 2520 4160Y, 4360Y 4800, 5040 6900, 7200, 7560 8320Y, 8720Y											
12470Y 13200Y	240											
	480, 600											
	2400, 2520 4800, 5040 6900, 7200, 7560											
22900△ 26400△ 34400△	2400, 2520 4160Y, 4360Y 4800, 5040 6900, 7200, 7560 8320Y, 8720Y											
	11950Y, 12000 12470Y, 12600 13090Y, 13200 13200Y, 13800Y 14400											
43800△ 67000△	2400, 2520 4160Y, 4360Y 4800, 5040 6900, 7200, 7560 8320Y, 8720Y											
	11950Y, 12000 12470Y, 12600 13090Y, 13200 13200Y, 13800Y 14400											

NEW RM LISTINGS

COMPLETE INFORMATION on the latest listings of RM transformers is in the hands of your G-E representative. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

401-1



Illustrated are three methods of supporting aerial cable — the conventional messenger and ring, the self-supporting, and the new method in which the cable is lashed to the messenger in the field and known as the "Spinner" method. All three are described and illustrated, their advantages set forth in a new catalog which we issued recently. We urge you to send for it today. We feel certain that the cost figures in the catalog will give you information you should have at hand.

There is just one important thing to remember regardless of the method of support — the cables are the important part of your aerial system. It's the sound engineering and the proven long, economical service life of Simplex Aerial Cables that have made them standard on so many public utility systems. Before you decide how you will support your aerial cables, let a Simplex cable engineer help design your new cables. He is well qualified to consider the various problems you must solve. You can depend on his recommendations for cable with long, trouble-free life.

Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

STANDARDS of DISTRIBUTION QUALITY

...For 75 Years

Thomas distribution porcelain and associated hardware are available for all your lines. You can also have the patented Thomas "Q-T" designs which eliminate insulator radio interference and boost customer goodwill.*

*Pat. No. 2154387

By 1953, experts predict four million new residential customers. Dollar wise, distribution equipment will take the lion's share of this electrical construction market.

Here are complementary situations: demand is on the upswing, porcelain is more available. Still, alert power companies insist on quality rather than quantity. They follow through with Thomas porcelain for distribution as well as transmission, and continue with Thomas hardware and fittings, too.

The Thomas trademark guarantees outstanding insulator performance and long insulator life. It assures all the advantages of Thomas Porcelain that has kept it the quality leader for the past 75 years.

For your distribution needs, ask first *how good,* not *how many.* The facts point to Thomas.

1873 THOMAS INSULATORS our 75th year RELIABILITY 1948

The R. Thomas and Sons Co.

LISBON, OHIO

NEW YORK CHICAGO

AGENTS IN PRINCIPAL CITIES

GEORGE E. HONN CO. San Francisco
R. E. CUNNINGHAM & SON Los Angeles
KEN H. BEST Seattle
J. E. REDMOND SUPPLY CO. Phoenix

Johns-Manville ANNOUNCES

Heat-proof. As the above demonstration shows, Quinterra Electrical Insulation can be brought to bright-red heat in an open flame without igniting or melting or deteriorating.

Thin and highly flexible, Quinterra is readily adapted for use on commercial wire-covering machines. Furnished in tape and roll forms from ¼" to 36" wide and in thicknesses from 1½ to 20 mils.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

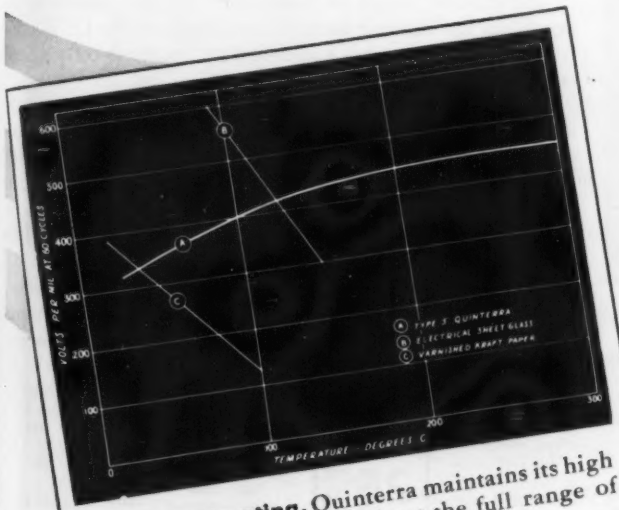
Quinterra

ELECTRICAL INSULATION

a new, heat-proof, inorganic asbestos-base dielectric . . . extremely thin and flexible

Deterioration of insulation due to heat has long been recognized as the major limiting factor in the life of electrical equipment. Quinterra Electrical Insulation, a product of Johns-Manville research, now offers designers and manufacturers a practical solution to this problem of insulation failures at elevated temperatures.

Quinterra is immune, even to bright-red heat. Its insulating efficiency remains unimpaired by prolonged high temperatures . . . *actually increases slightly with rising temperatures.* At 300° C., its dielectric strength approaches 400 V.P.M. Even at 800° C., a temperature ruinous to the dielectric efficiency of any other flexible insulation, Quinterra withstands 100 V.P.M., while displaying superior mechanical and heat-dissipating qualities.



Non-deteriorating, Quinterra maintains its high dielectric strength throughout the full range of operating temperatures, as indicated above.

Quinterra's unique properties confirmed by test and usage

Quinterra has undergone extensive testing for several years . . . in both laboratory and field . . . and as an actual production material in a large number of commercial transformers.

Results—(1) Four years of industrial operation in arc-welding and distribution service without deterioration. (2) In standard aging tests, Quinterra suffered no decrease in tensile strength after 710 *consecutive days* at 175° C. In comparison, cellulose materials were charred to cinders in a few hours, while standard commercial asbestos papers lost 90% of their tensile strength in less than 90 days. (3) The dielectric strength of Quinterra remained constant throughout the tests.

Quinterra's thermal stability, coupled with its thinness and extreme flexibility, also enables designers to realize hitherto unattainable space and weight economies, as well as material cost savings. Your inquiries concerning this unique electrical insulation are invited. For samples and complete information, address Johns-Manville, Box 290, New York 16, N. Y.

Quinterra ELECTRICAL INSULATION

*DFR Regulator Control is Simplest – Yet Holds

±1v. BAND!

CONTROLS ARE ACCURATE, EASY-TO-SET AS A RESULT OF UNIQUE UNIT CONSTRUCTION!

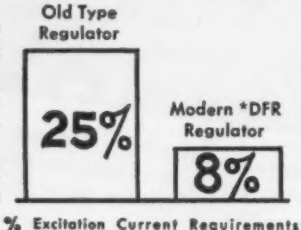
YOU CAN MAINTAIN ± 1 volt band widths with the Modern Allis-Chalmers *DFR Feeder Voltage Regulator. These narrow band widths are made possible by automatic "Feather Touch" control and full voltage integration. In addition, controls are understandable . . . accessible . . . easy to set . . . due to Allis-Chalmers unique unit-control construction.

The control is easy to maintain. No troublesome compounding or holding coils are required in the DFR control . . . relay setting is simplified . . . because only micro energy is handled by relay contacts.

And too, the Modern *DFR regulator requires only 8% excitation . . . compared with the 25% excitation required by conventional regulators. High exciting current is important to you in terms of cost of equipment used for unnecessary excitation of regulators . . . in terms of installed capacitors . . . at $10 per kva . . . needed to balance high exciting current.

For further details on how you can get this simple, close voltage control, call your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2337

A rugged, self centering shock absorbing quick-break mechanism is employed in the DFR regulator. Mechanism is immersed in oil — self lubricated—dirt free.



% Excitation Current Requirements based on Regulator kva

The chart tells the story of big savings in excitation current from the DFR, and savings on fixed capacitors needed to balance high exciting current.

*DFR — *the only station type step regulator you can buy for single phase duty. Size up to 6900 v, 250 kva. AFR — for 3 phase regulation.*

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

• MAXIMUM PROTECTION AND LONG LIFE •

CRESCENT

TYPE RLJFJ
THREE CONDUCTOR
Also all standard types of metallic Parkway cables, to I.P.C.E.A. specs. Special cables to customer's specifications.

Steel Taped

PARKWAY CABLE

Insulated with CRESCENT ENDURITE Heat-Resistant rubber insulation (75° C) in 600 to 5000 volt range. Or with Varnished Cambric for maximum current carrying capacity or higher voltages.

No other protection required except at points of extreme mechanical hazard. Being well protected from ordinary mechanical injury and easy to install, they provide an economical permanent underground system.

These cables are widely used for street lighting circuits, railroad yard lighting and signal systems, airport power and lighting circuits and in industrial plants and mines.

CRESCENT WIRE & CABLE

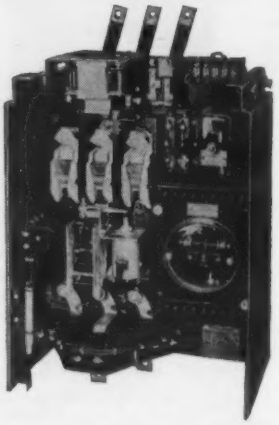
CRESCENT WIRE AND CABLE CO.
TRENTON, N. J.

...TO IMPROVED SERVICE CONTINUITY IN MEDIUM-DENSITY AREAS!

Now you can extend the advantages of a-c secondary network systems to medium-density areas . . . where there is a growing demand for improved service reliability, voltage regulation and system flexibility. You can do it economically, too, for the new CM-88 network protector was developed specifically for use in areas with overhead distribution lines where a modified or low-cost form of secondary network is practical. These would include small outlying business sections and heavily loaded residential areas in large cities, and the commercial districts in smaller cities and large towns.

The protector is an automatic, electrically-operated air circuit breaker, controlled by network relays. The opening of the protector automatically isolates a faulted primary circuit or network transformer *without interrupting the power supply to any consumer.*

In broadening the field for a-c network systems, Westinghouse offers a practical solution to your service problem in areas of lighter load density. For more information on the CM-88 call your Westinghouse office or write for booklet B-3977. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60670

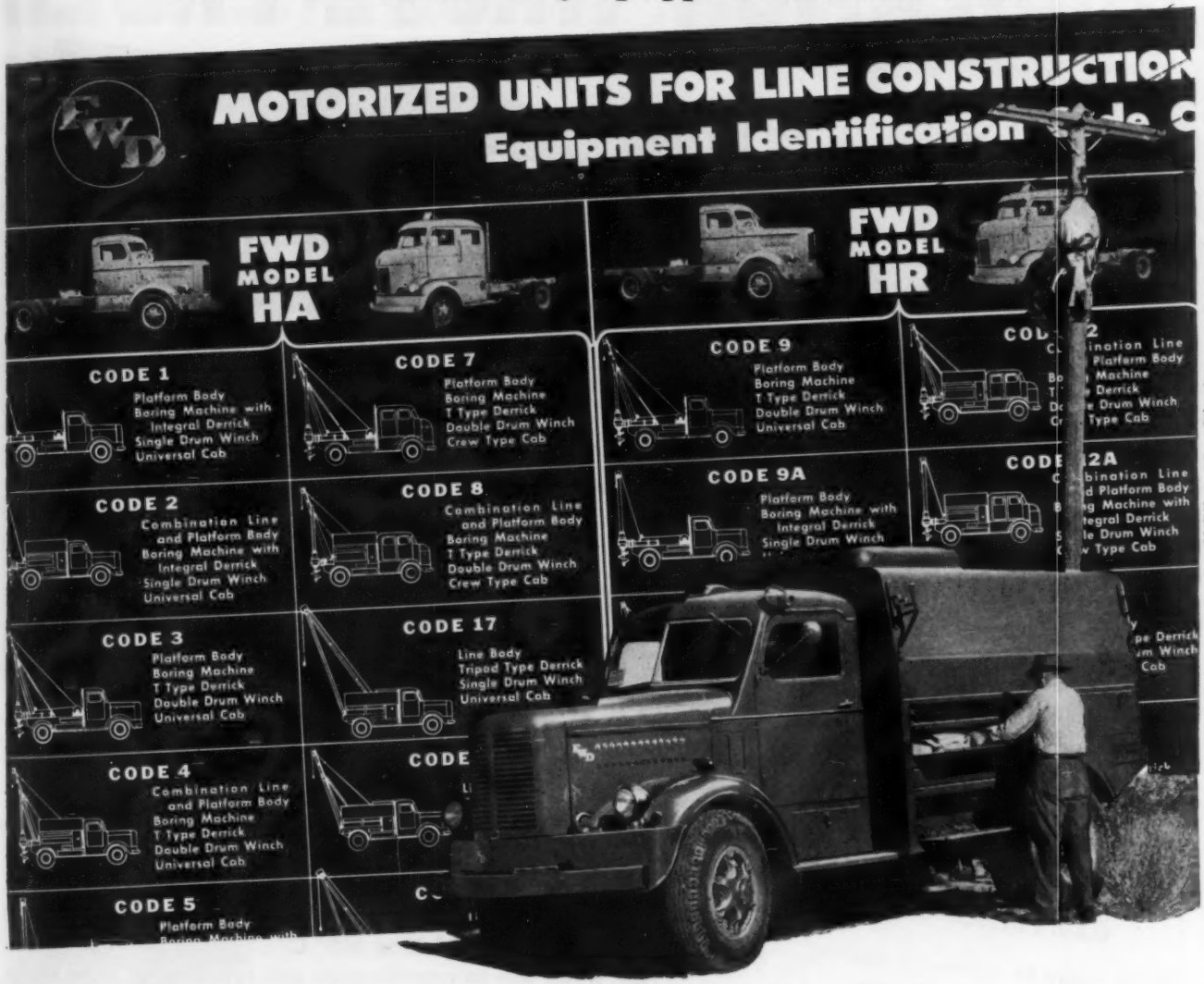


The CM-88, light-duty, network protector removed from weatherproof enclosure. The unit can be mounted on a pole or crossarm with existing transformers.

Westinghouse
PLANTS IN 25 CITIES... OFFICES EVERYWHERE
NETWORK PROTECTORS

Avoid the High Cost of "SPECIALS"

. . . Select to Meet Your Individual Needs From This Wide Range of Standardized FWD BUILT-TO-CODE Fully Equipped Motorized Units



YOU can simplify and cut the cost of your purchase of line construction and maintenance motor trucks.

Select from the FWD series of "built-to-code" motorized units — make your choice from 38 units — specify the Code Number and get a unit equipped as you want it — with earth-boring machine, integral or T Type derrick, single or double drum winch, platform or compartment body, conventional or 5-man cab — and in 3 models of four-wheel-drive trucks in capacities to meet every line construction and maintenance need — on or off the road.

And you can purchase from a single, centralized, dependable source. The Four Wheel Drive Auto Company engineer and build the complete motorized unit.

For complete information and Code Chart, see Graybar or write —

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: KITCHENER, ONTARIO

Built-to-Code
MOTORIZED UNITS
FOR LINE CONSTRUCTION AND MAINTENANCE

Built By

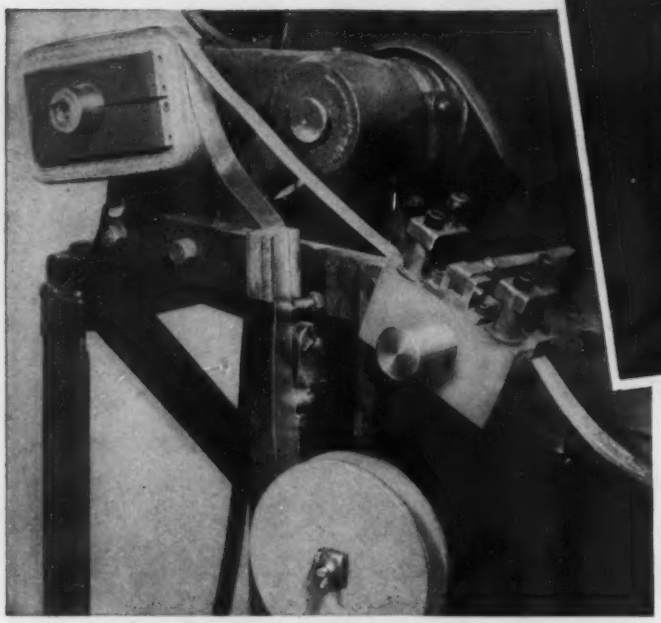
Makers of America's Foremost Heavy Duty Truck

Distributed by Graybar

"COIL SIZE REDUCED 15% INSULATION WASTE ENDED

WITH

IRVINGTON SILICONE VARNISHED FIBERGLAS"



High speed coil winding at Goodrich Welding Equipment Co. using Irvington Silicone Varnished Fiberglas Tape.

SAYS JERRY GREENE
Vice President
Goodrich Welding Equipment Co.

To increase compactness, and obtain a greater allowable temperature rise in welding transformers, Goodrich Welding Equipment Co. uses Irvington Silicone Varnished Fiberglas for coil insulation. Results – tape thickness reduced 66%; tighter, neater coils *reduced 15% in size;* allowable temperature rise increased from 90° C. to 140° C.

And waste due to imperfections and breakage of tape, which formerly amounted to as much as 20%, has been eliminated. "We have no waste with Irvington tape," says Mr. Greene, "and coil winding has been speeded."

Irvington Silicone Varnished Fiberglas can do a similar job for you. It is Class "H" insulation, with exceptional resistance to heat, moisture, acids and alkalies, recommended for coil and cable wrapping, slot insulation, and phase insulation.

Ask your Irvington representative, or write for further information and test data.

IRVINGTON CLASS B INSULATIONS

Varnished Fiberglas—high dielectric and tensile strength, excellent moisture resistance. Black and yellow, .003" to .030".

Varnished Fiberglas, Style OW – wide mesh varnished Fiberglas, for good dielectric strength and low cost. Black and yellow, .007", .010" and .012".

STANDARD OF THE WORLD IRVINGTON INSULATION

IRVINGTON *Varnish & Insulator Co.*

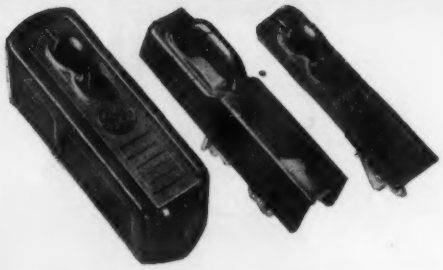
Irvington 11, New Jersey

Represented in the Western States by C. D. La MOREE — Los Angeles — San Francisco — Seattle; ELECTRIC MOTOR SUPPLY CO., Denver

PRIMARY FUSE CUTOUTS

for all service requirements

INDICATING—DROP-OUT—RECLOSING



Interchangeable doors make these enclosed cutouts the most versatile in their field. *Three interchangeable doors*—indicating and drop-out, two-element reclosing, and disconnect—available for each current rating; *fit both the 5-kv and the 7.5-kv housings*. Just five major stock parts, for both 50- and 100-ampere ratings, fill all your requirements. Bulletin GEA-3448-B tells the complete story.

NON-INDICATING

These cutouts, lowest in price of all wet-process porcelain-enclosed cutouts, enable appreciable savings where indication is not necessary.

With exceptionally liberal design of contact areas and interlocking barriers, these cutouts are tops in the non-indicating field.

More than a million and a half in service have proved their high mechanical and electrical strength, and overall durability. Bulletin GEA-2390-C gives complete information.

General Electric also has a complete line of oil fuse cutouts, secondary cutouts and fuses, and universal conventional and Hi-surge fuse links. ***Apparatus Department, General Electric Company, Schenectady 5, N. Y.***

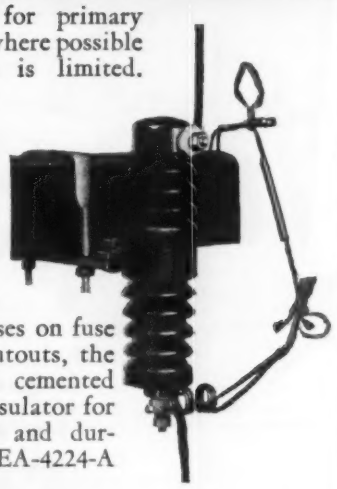
Compare each with its field for reliability, performance and flexibility of application!

OPEN-TYPE, DROP-OUT

This is the first "bird-proof" cutout in the open-type drop-out field. The mounting support is cemented into the one-piece solid insulator in the *opposite side* from all live parts—minimizing possibility of bird or animal blowing a fuse by touching a live part and the mounting at the same time. Note the closely coupled fuseholder which can be removed or replaced easily with standard switch stick.

FLIP-OPEN

A low-cost cutout for primary fusing of rural lines where possible short-circuit current is limited. Like the open-type drop-out cutout the Flip-open cutout is virtually "bird-proof." Double-wedge silver-plated contacts grip the fuse link cable. Helical-wound springs retard vibration stresses on fuse link. Like all G-E cutouts, the mounting support is cemented into the porcelain insulator for exceptional strength and durability. Bulletin GEA-4224-A gives details.

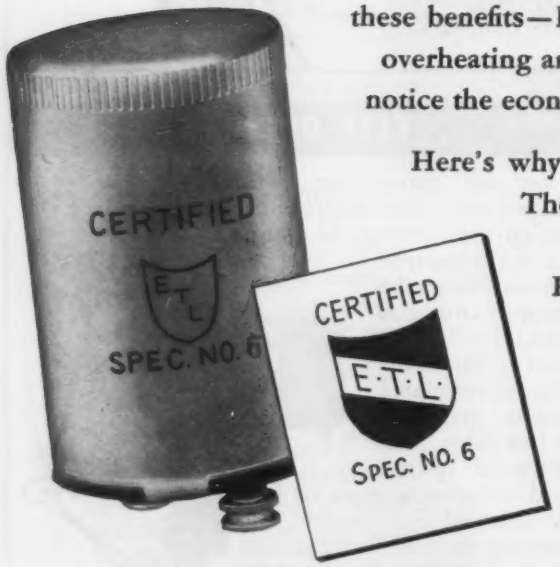


GENERAL ELECTRIC

406-22

You're off to a good start WITH Certified Starters

Certified Starters play an important role in fluorescent lighting. When your fixtures are equipped with Certified Starters, you are assured of these benefits—longer starter life, less ballast overheating and longer lamp life. You quickly notice the economy in maintenance costs.



Here's why Certified Starters are better: They're made to rigid specifications set up by foremost lighting experts—then tested and checked by famous Electrical Testing Laboratories, Inc.

You'll assure satisfaction, give customers a good start, when you specify Certified Starters—the ones bearing the famous shield "Certified ETL".

All Fleur-O-Lier fixtures use Certified Starters

Address inquiries to any of the following manufacturers of

Certified Starters

The Arrow-Hart and Hegeman Co., Hartford, Connecticut
The Bryant Electric Co., Bridgeport, Connecticut
Chatham Electronics Corporation, Newark, N. J.
Dura Electric Lamp Co., Newark, N. J.
General Electric Co., Bridgeport, Connecticut
Harvey Hubbell, Inc., Bridgeport, Connecticut
Instant Glow Starter Corporation, New York, N. Y.
Kuthe Laboratories, Inc., Newark, N. J.
The Lloyd Products Co., Providence, R. I.
Pass & Seymour Co., Syracuse, N. Y.
Sheldon Electric Co., Irvington, N. J.

What Does RACO Mean?

RACO (rā'co) 1. The top line of steel switch and outlet boxes. 2. Quick, easy installation for contractors. 3. Dependability for architects. 4. Customer preference and steady demand for jobbers.

You don't need a dictionary to find out what RACO means to the electrical trade. The RACO Line is approved by the Underwriters' Laboratories, Inc. Contractors prefer the well known RACO quality. Architects specify the reliable RACO Line. Wholesalers enjoy the profitable repetitive volume.

You can always rely on RACO

RACO

ALL-STEEL PRODUCTS

ALL-STEEL EQUIPMENT Inc.—800 Kensington Ave., Aurora, Illinois

"A BOX FOR EVERY NEED"

UNION PACIFIC

The Governor of Washington invites You

State of Washington
EXECUTIVE DEPARTMENT
Olympia

MON C. WALLGREN
Governor

To American Industry:

Washington is a fast growing state. We are extending our war-time gains and making great strides forward. People are hard at work building more dams, laying out new towns, preparing new land for farms.

The Columbia River is the greatest single source of electrical power in the world. With low-cost power, our wealth of natural resources, and our maritime trade with Alaska and the Orient we are establishing a regional economy unrivalled in the nation.

Enterprising business men will find here new and exciting industrial opportunities. These include processing of raw materials, fabrication of new products, diversified trades to service a growing city and farm population.

Washington State is a good place in which to live, to work, to do business and to prosper.

Governor

Mon C. Wallgren

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

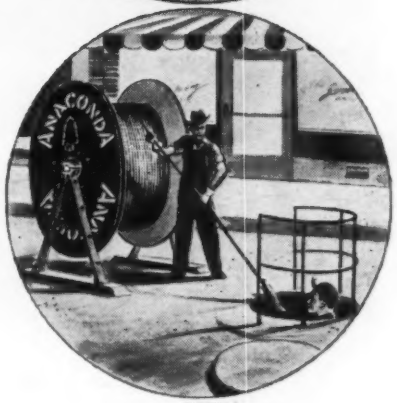
*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

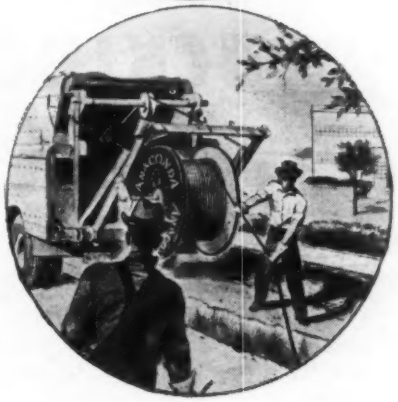
UNION PACIFIC RAILROAD

Road of the Daily Streamliners

PICK ANY SPOT... THEN PICK

Durasheath





FOR POWER DISTRIBUTION, you can use a single type and size of Durasheath cable—whether it's small or large—one, two or three conductors—in runs that are in the air, in conduit or directly in the ground.

ADVANTAGES IN DURASHEATH:

High tensile strength and strong resistance to flame and abrasion.

Extreme flexibility that makes handling easy.

Resistance to moisture, acids and alkalies generally found in the soil.

No problems of electrolysis, corrosion and extremes in temperature.

Write for Bulletin DM 4820, "Durasheath, the All-Purpose Cable."

48479

ANACONDA WIRE & CABLE COMPANY

25 Broadway, New York 4, N. Y.

THE ALL-PURPOSE CABLE

Anacondaloy*-coated copper conductors are insulated with a moisture-resisting synthetic rubber compound, bound with color-coded rubber-filled tape and enclosed in a tough, high mechanical strength, moisture- and flame-resistant outer jacket of Neoprene. Conductors have the lasting protection of a solid block of synthetic rubber and Neoprene.

*Reg. U. S. Pat. Off.

ANACONDA
from mine to consumer

Turn freely in this belt . . .

BUCKINGHAM *Glider* TOOL BELT

Yes, with this tool belt, you can turn up to 4½" right or left without binding your clothes or cramping your tools. That's because the Glider Tool Belt has a "floating" feature that allows fuller, freer body movement. Here's how: The middle belt, attached to the safety strap, does not move when you turn. The safety strap does not shift on the pole. The outer strap and inner liner slide easily without pulling or binding . . . without costly wear and tear on your clothing. Tool loops remain full and open. You can turn without tiresome, time-consuming shifting of your feet. You can change your position quickly, easily and safely.

And you can depend on the Glider Tool Belt for that all-important safety too. It's made of stout, tan-colored harness leather and stitched with tough nylon thread. It's built to the highest standards of quality to give you a good, dependable belt.

A BUCKINGHAM BELT is a good belt.

A BUCKINGHAM BELT is designed for comfort and ease of movement.

A BUCKINGHAM BELT is built to make safety a certainty.

BUCKINGHAM TOOL BELT NO. 1201

BUCKINGHAM TOOL BELT NO. 1201

A sturdy, practical tool belt built to give you years of comfortable, trouble-free service. Rolled edge leather lining. Inner belt is 4½" at back, tapering to 2½" at heel of dee ring. 2" belt strap has five tool loops and is fitted with harness ring, snap hook and tape thong. Inner belt has tab extended on each side. To these you can rivet any standard or special tool holsters or pouches.

See these tool belts at your regular supply house, or—write directly to us for Catalog 548 describing the full Buckingham line of equipment.

BUCKINGHAM MANUFACTURING CO., INC.
5-7 Travis Street Binghamton, N. Y.

PRODUCT NEWS

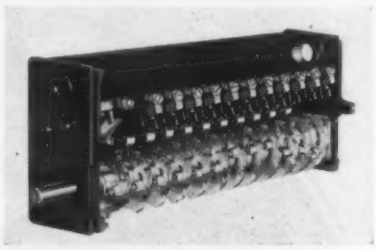
Oil Circuit Breakers (1000)

Allis-Chalmers high-voltage, high-speed, quick-clearing, outdoor, frame-mounted oil circuit breaker type FZO-151, announced earlier this year in 69-kv. ratings from 500,000 to 1,500,000 kva. interrupting capacities, is now available in interrupting capacities to 2,500,000 kva.

The new breaker is of all-welded steel fabrication throughout, including the top frame insulator support, resulting in decrease in total breaker weight. The type FZO-151 is equipped with new improved design Ruptor interrupting device capable of ultra high-speed circuit interruption, and a high-speed, mechanically trip-free electro-pneumatic operator which permit 20-cycle fast reclosing service. Solenoid operation is also available for standard reclosing service.

Limit Switch (1001)

Allen-Bradley has a new heavy-duty rotating cam limit switch, Bulletin 801. It opens and closes up to 12 circuits at any position of the actuating cam shaft. Switches are available for 3, 4, 6 or 9 circuits only. All circuits can open or close in any sequence or elapsed time. Each cam is indexed for accurate setting. Contactors are individually detachable and the shaft and cam assembly is easily removed for adjustment. This switch is said to be adaptable to any programming control or time-sequence operation. Available in general-purpose or watertight enclosures.



Closing Device (1002)

G-E has developed a manually operated stored energy closing device for closing magnetic-type circuit breakers in locations where no suitable source of electric closing power is available. According to the manufacturer, this device will safely close the breaker under all conditions within its rating, including closing and latching against maximum rated short-circuit current. Following trial installations, it is expected that mechanisms will be available for the company's Magneblast breakers rated 5 and 15 kv., 100,000 to 5,000,000 kva. inclusive.

Control Relay (1003)

Struthers-Dunn is offering a small-size control relay for use on d-c, a-c and halfway rectified a-c. It has DP, DT contacts rated 2 amp. at 115 volts a-c. Normal d-c operating power is .15 watts with maximum coil resistance of 2,200 ohms. A-c relays operate on approximately 9 va. with coils up to 115 volts, 60 cycles.

In transit or installed ALUMINUM Wire COSTS LESS

The lighter weight of wire and cable with Alcoa E.C.* Aluminum means lower transportation costs—a big item for a utility that deals in big cable tonnages. That lighter weight means easier handling.

Compare these weatherproof wire weights: No. 4 TBWP with aluminum conductor weighs less than ¾ of the equivalent copper conductor.

Cable price is all in your favor, too. The bigger the conductor, the greater the economy. In aerial cable, for example, aluminum conductor can mean tremendous savings over copper.

Alcoa makes light, strong, conductive E.C. Aluminum, which leading wire manufacturers draw, strand, and insulate, and sell it under their own trade marks. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Bldg, Pittsburgh 19, Pa.

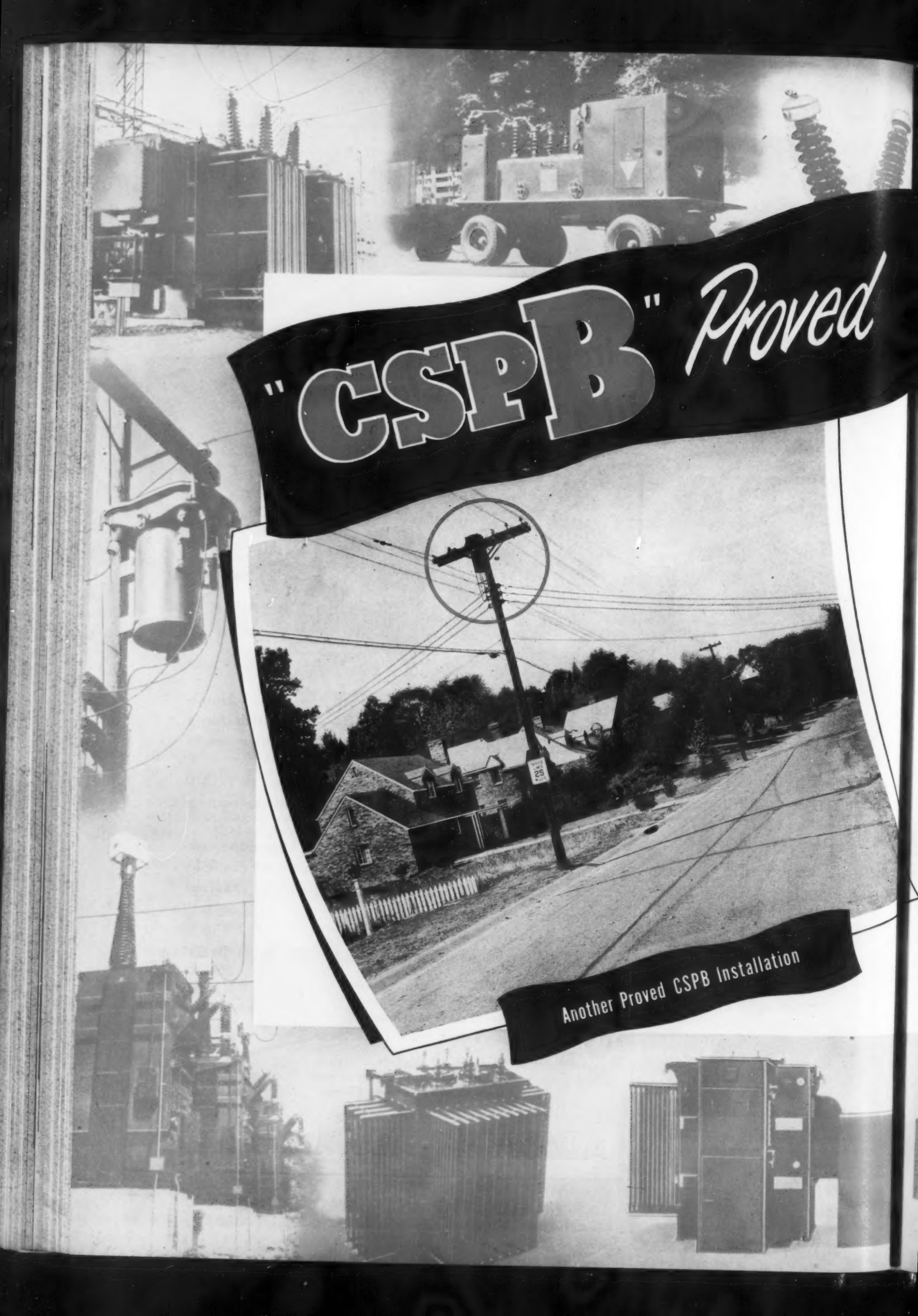
The BIG difference is in your COSTS!

*E. C.: *Electrical Conductor* Aluminum

ALCOA EC ALUMINUM

ALCOA ALUMINUM ®

FOR ELECTRIC WIRE AND CABLE


"CSPB" Proved
Another Proved CSPB Installation

162 Users During Two-Year Period Find CSPB Distribution Transformers Solve Problems of Secondary Banking

Here's proof of successful secondary banking. Several thousand CSPB's have been put in operation . . . with perfect system performance at every installation . . . and not a single transformer failure.

Furthermore, these CSPB's with combined ratings of 51,250 kva, are serving a load for which nearly 70,000 kva of conventional transformers in radial distribution would be required.

Every CSPB transformer is doing the job it was designed for:

- Giving Complete Self-Protection, and
- Improving service for residential areas
- With less installed capacity.

Important dollar savings result from use of the CSPB in secondary banking because fewer transformers are required. Banking also improves voltage regulation and reduces light flicker . . . without extra cost.

The thermally controlled warning light gives notice of serious overloads. Dangerous overloads are prevented and secondary faults isolated by built-in breakers without loss of transformer capacity. This sectionalizing permits heavier loading without risk of cascading.

The CSPB has passed its introductory period with flying colors. Units are available in quantity. Start now to use them in every proper application and profit from their advantages.

ONLY THE BASIC CSP DESIGN

Gives you all 4!

(1) Low-cost installation and maintenance through Complete Self-Protection against
(2) Lightning,
(3) Short Circuits and
(4) Dangerous Overloads.

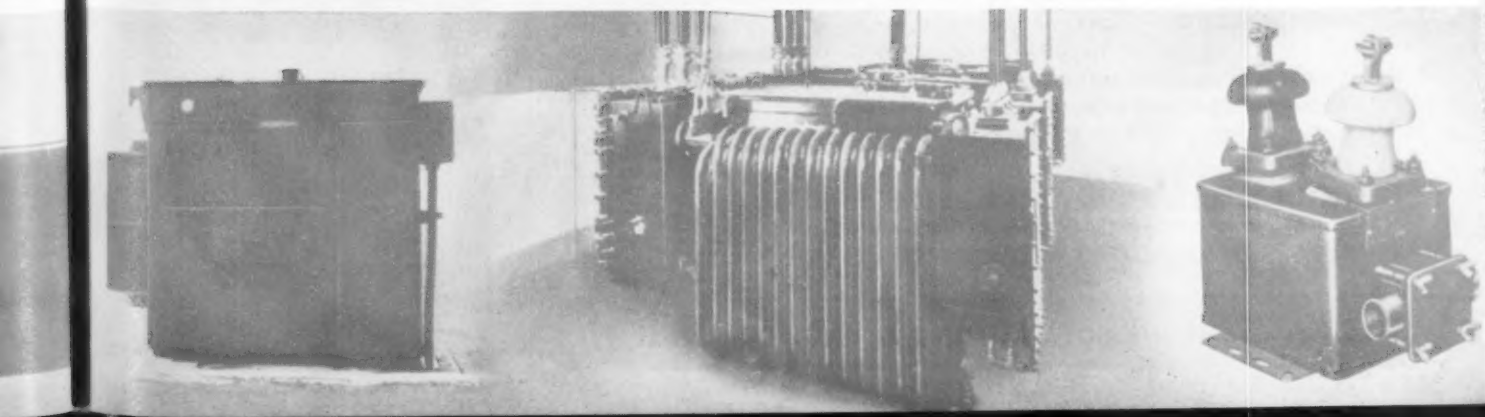
For complete data—Booklet B-3777—call your nearest Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

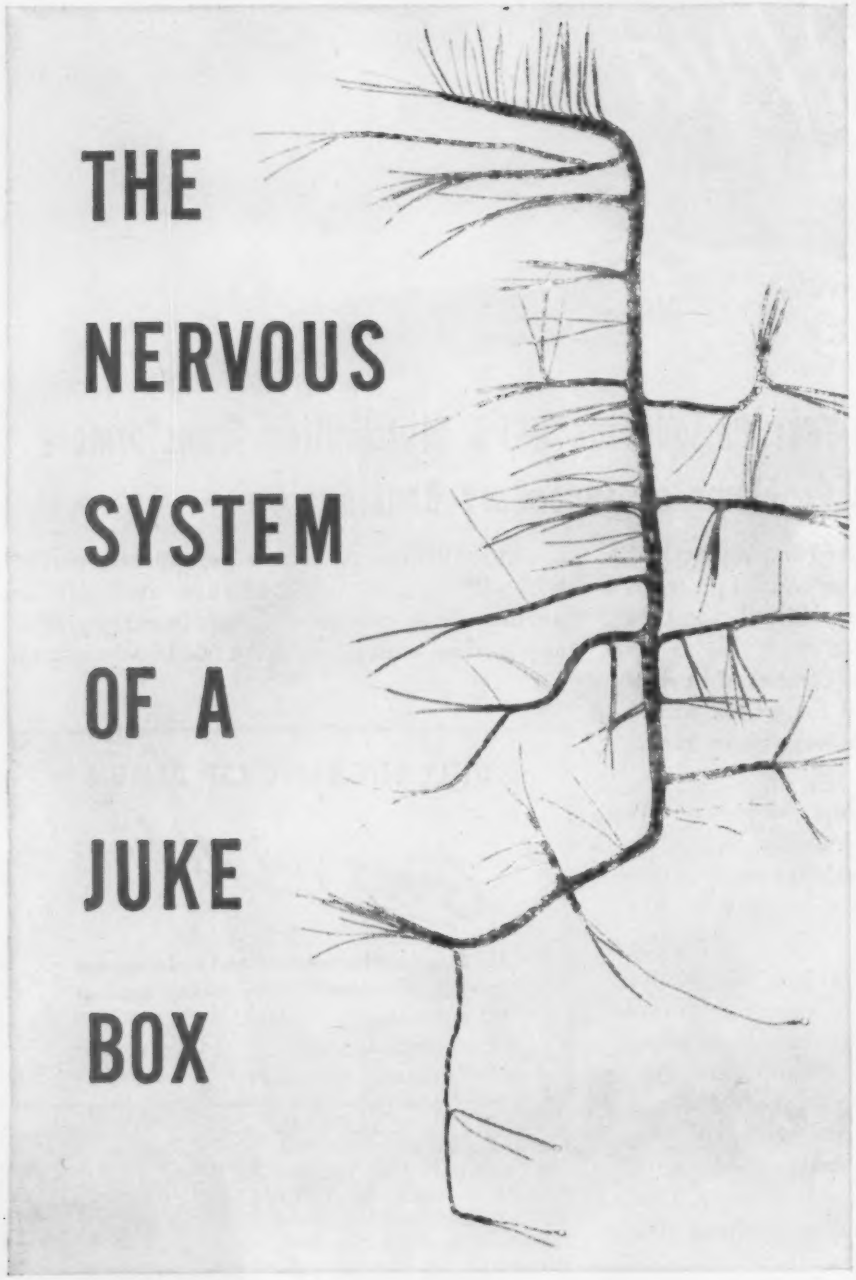
Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

CSPB DISTRIBUTION TRANSFORMERS

J-70509

FOR MORE POWER . . . WITH MORE DEPENDABILITY . . . FROM LESS INSTALLED CAPACITY





With its branching wires securely bound with No. 33 "SCOTCH" Electrical Tape with Vinyl Plastic backing there is no danger that the juke box whose harness is shown above will have a "nervous" breakdown. The flexible plastic backed tape does not come loose, does not permit wires to slip or shift, yet provides a completely flexible harness. Harnesses for automatic washers, traffic signals, burglar alarms, vending machines, and installations exposed to moisture or corrosive fumes, are given effective protection by half-lapped impervious sheaths of No. 33 "SCOTCH" Electrical Tape.

No 33 "SCOTCH" Tape has effected so many economies for others that it is a practical certainty that it will do as much for you. Write today for additional information.

No. 33 SCOTCH BRAND Electrical TAPE

ANOTHER 3M COMPANY PRODUCT

Made in U.S.A. by MINNESOTA MINING & MFG. CO. St. Paul 6, Minn.

Synchronous Differential (1004)

Square D has developed a synchronous differential, housed in a single frame, weighing 28 oz. The unit consists of two synchronous motors and a mechanical differential. Each of the motors reflects the operating speed of an engine. The two motors in turn activate a ¼-in. threaded output shaft which rotates at a rate equal to one-half the difference of the speeds of the two motors. When the speeds of the two motors are equalized, the output shaft of the unit becomes stationary.

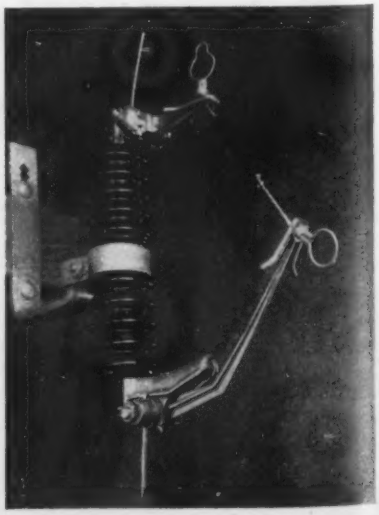
The unit operates from a 3-phase source over a frequency range of 15 to 60 cycles per second, with an input voltage of .007 times the frequency in cycles per minute. Also available are similar units wound for high voltages and 2- or single-phase operation.

Magnetic Starters (1005)

Ward Leonard is offering its new Bulletin 4111 size 1 a-c magnetic starters for nonreversing, across-the-line starting of polyphase squirrel-cage induction motors and single-phase motors. Available with open-type construction or with NEMA type 1 general-purpose enclosures, these starters are suitable for use with separate pilot devices for 2- or 3-wire remote control or can be supplied wtth local control push-button stations or selector switches. They have a maximum enclosed rating of 7½ hp., 440/550 volts, three phase, 60 cycles. Standard operating coils can be furnished for 110-, 208/220-, 440- and 550-volt, 25-, 50- or 60-cycle service. Dual voltage coils can be supplied for 110/220 or 220/440 volts, 60 cycles.

Cutout (1006)

A. B. Chance is offering a new open-link cutout, with bronze fittings throughout. The terminal separation spring of this cutout is covered by a protective housing to prevent ice and sleet from interferring with operation. Short arcing time and rapid opening of the circuit are assured by the terminal spring load exerted on the fuse, according to the manufacturer, and the spring also absorbs the shock of overtravel. The spring is so located that it cannot be overstretched and damaged in handling the cutout, it is stated. Pressure-type conductor terminals are shaped to make four point line contact with any size jumper used. Slots on both sides of each arm afford easy fusing from either side.



WITH

CENTRAL SPANG CONDUIT

You're sure of..

EASY BENDING

Any old timer will tell you that Central Rigid Steel Conduit has always been famous for its excellent bending properties. It gets that way because it is made from carefully selected steel that's as ductile as it is strong.

You'll find that most sizes of Central Conduit are easy-to-bend with an ordinary hickey. And when bent, it will not crack, crush or ripple . . . or damage its protective coating in any way.

Central Conduit is handled by a distributor near you. When you call him he will do everything he can to make deliveries as quickly as possible in spite of today's unprecedented demand.

SPANG-CHALFANT
Division of The National Supply Company

General Sales Office: Grant Building, Pittsburgh, Pa.
District Offices and Sales Representatives in Principal Cities

There's Tested Strength in Every Length.

CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

Another contribution to better anchoring...

- **GREATER HOLDING AREA.** This new Chance Anchor has 8 blades that expand to form a square, with equalized load distribution all around the anchor. Each blade is required to carry only one eighth of the load.
- **GREATER HOLDING POWER.** The 8-way Anchor expands in the shape of a cone and holds like a wedge against undisturbed earth on all sides. The pulling force is exerted over a wide area building up compression against an inverted pyramid of earth.
- **SIMPLE CONSTRUCTION.** There are no moving parts, arms, or mechanical devices to hinder the smooth operation of the 8-way anchor.
- **STURDILY BUILT.** It is designed to expand easily without sacrificing strength. Hinges will not collapse under strain and each of the eight blades is formed with a reinforcing rib that prevents buckling.
- **RETAINS SHAPE UNDER HEAVY LOAD.** Repeated pull out tests show that the blades will not collapse or bend under an extremely heavy load. These tests show that the new Chance 8-way Anchor develops more holding power under the same conditions than other expanding anchors of comparable size.
- **EASY, SURE EXPANSION.** The new anchor is easily expanded because the pre-formed blades cut into solid earth with a minimum of disturbance and the pointed corner blades make starting easy. It requires from 3 to 9 less blows to expand. Linemen can easily tell when the anchor is fully expanded by the sound of the top plate hitting the bell-shaped blade stop.
- **BLADES ARE SUPPORTED BY BASE PLATE.** Blades are supported in the cone shape so that they will not buckle down in the middle. The diagram at right shows anchor in expanded position and illustrates how base plate supports blades.
- **NUT RETAINER AIDS INSTALLATION.** The Chance Nut Retainer, shown in diagram, makes it easy to push anchor to bottom of hole. The anchor rod and nut cannot be pulled through the base plate.

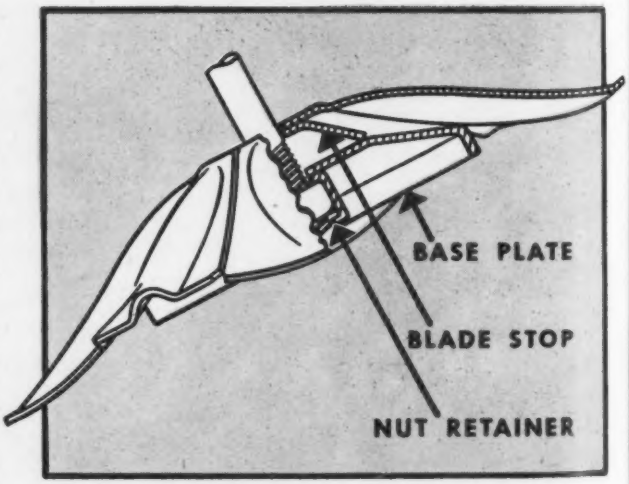


Diagram of Chance 8-way Anchor expanded, showing base plate, nut retainer, and blade stop.

More than 12,000,000 Chance Anchors have been put in service!

A·B·CHANCE CO·

New CHANCE 8-way Expanding Anchor

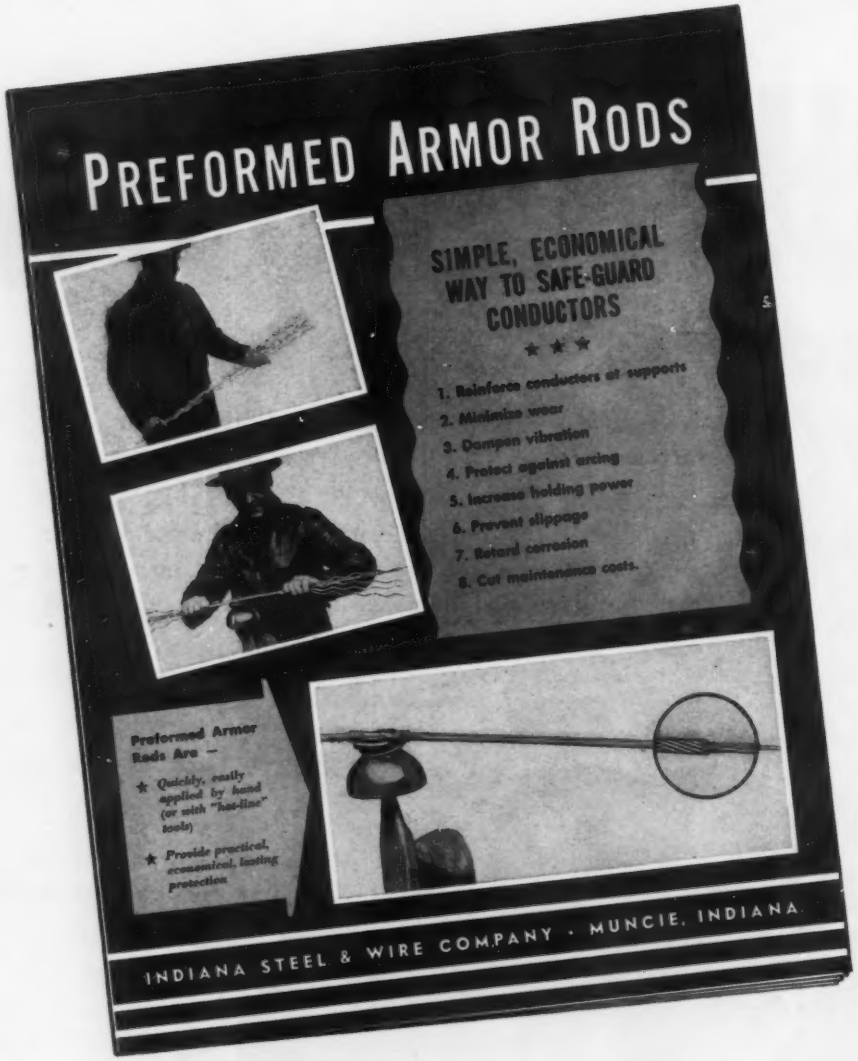
Here is another answer to the problem of rapidly rising line construction costs! The new Chance 8-way Expanding Anchor gives you more holding power for less money.

Better load distribution makes this new Chance Anchor stronger than other expanding anchors — and the absolute simplicity of its construction makes it the most smoothly operating expanding anchor on the market.

C4816

CENTRALIA, MO., SAN FRANCISCO, CAL.

ABC INDUSTRIES


PREFORMED ARMOR RODS
SIMPLE, ECONOMICAL WAY TO SAFE-GUARD CONDUCTORS
1. Reinforce conductors at supports
2. Minimize wear
3. Dampen vibration
4. Protect against arcing
5. Increase holding power
6. Prevent slippage
7. Retard corrosion
8. Cut maintenance costs.
Preformed Armor Rods Are —
Quickly, easily applied by hand (or with "hot-line" tools)
Provide practical, economical, lasting protection
INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

Write for This Booklet!

PREFORMED ARMOR RODS provide a simple, practical, economical method of reinforcing and protecting overhead conductors at the point of and in the region of the supports. They minimize wear and chafing, tend to absorb and dissipate vibration, protect the conductor against arching and flash-overs, afford increased holding power against slippage, lessen the possibilities of corrosion, reduce overall maintenance expense.

Easily applied by hand or with "hot line" tools. Available in galvanized or stainless steel, aluminum, copper or bronze.

Distributed by GraybaR ELECTRIC COMPANY

Please ask for Booklet PR-101

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

Transformers (1007)

Westinghouse has added 25- and 37½-kva. transformers to its line of CSPB units for banked-secondary operation. They are designed with all the protective features of the CSP distribution transformers and of the smaller CSPB units. Proper coordination in case of over loads or faults on the secondary is provided by newly developed, high-interrupting-capacity, type BR secondary breakers built in to the transformers. Unusual conditions on any section of the secondary will be isolated by these breakers without affecting the remainder of the bank or producing any tendency to cascade, the manufacturer reports. A faulty transformer will be completely isolated from the system by the combined operation of the primary protective links and the secondary breakers.

General-Purpose Turbine (1008)

An all-weather general-purpose turbine for driving industrial pumps, fans, blowers, compressors, paper machinery and small generators is offered by Westinghouse. A choice of three wheel sizes, 16-, 20- and 25-in., allow application over a range of 5 to 1 500 hp. with steam conditions up to 600 lb. ga at 750° F. and speeds of 1,000 to 7,000 rpm. Equipped with heavy-duty parts, the turbine will operate at 1,500 lb. ga at 950° F. Many parts are interchangeable between wheel sizes.

Wood Guy Insulator (1009)

A wood guy insulator to support and brace wooden poles used in wood structures has been announced by Locke Inc. The wood member of the insulator is made of dense structural douglas fir and, if desired, can be furnished creosote-treated. One pair of arcing horns protects the wood member in case of flashover. An extra pair of horns can be supplied if required. All fittings are of the clevis type and are galvanized by the manufacturer's double-dip perma-zinc method.

Load Centers (1010)

A new line of Quicklag load centers with 2, 4, or 8 circuit breaker positions has been announced by Westinghouse. Thermal magnetic breakers for 10- to 15-amp. ratings give completely automatic protection for home wiring circuits. They are self-aligning, may be installed in spare circuit positions as required.

Pyranol Motor Capacitor (1011)

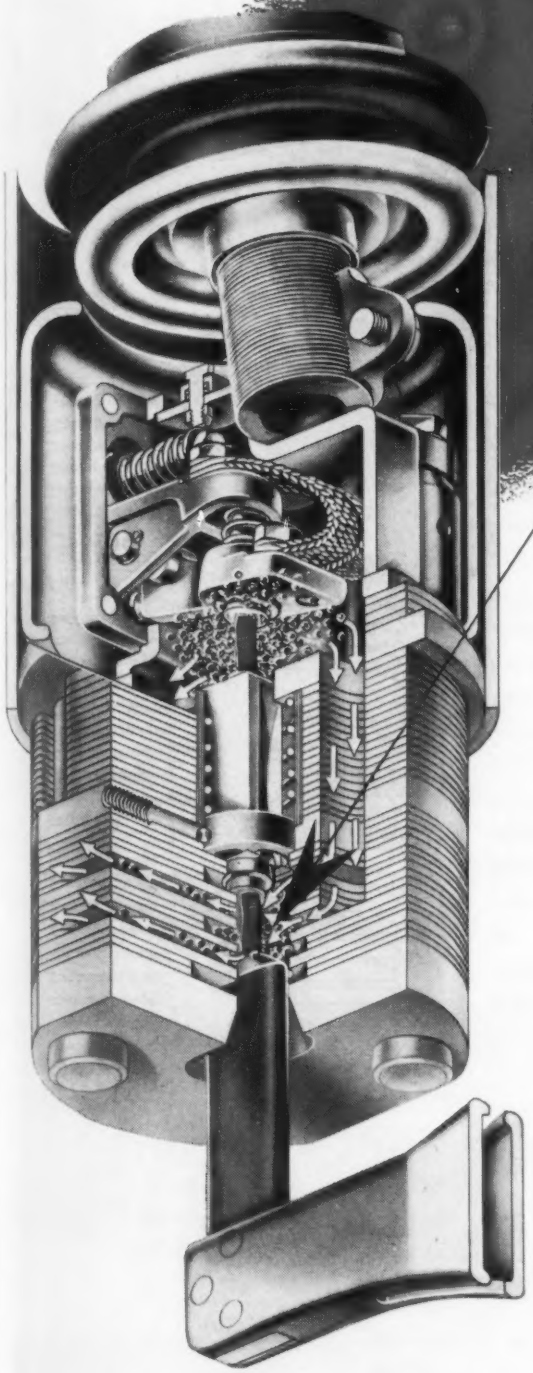
A pyranol motor capacitor, designed to withstand the same physical treatment as the motor, has been announced by General Electric. Available from stock in all popular ratings, the new capacitor is completely enclosed in 10-gage steel tubing. Bushings are silicone; steel mounting bracket is spot-welded to the capacitor enclosure.

F Diffuser Strip (1012)

A lightweight fluorescent diffuser strip for use in illuminated display signs and lighting fixtures has been developed by Extruders Inc. It comes in widths up to 19 in. and thicknesses from .050 to .093 in. Softening point is said to be about 150° F. It is available in various densities of white and colors; is extruded in flat, angular, semi-circular sheets or in desired cross section.

The case of the arc that chokes itself

. . . TO GIVE YOU BETTER SYSTEM PROTECTION



It protects your system . . . it protects itself—the Westinghouse GM Oil Circuit Breaker.

A faster opening time—5 and 3 cycles—assures swift isolation of valuable system equipment when fault conditions occur. And the same action that guarantees quick, positive protection for your system also works to protect the breaker itself. The secret is the multi-flow "De-ion" grid that extinguishes the arc so quickly that it cannot damage the breaker.

Actually, the arc chokes itself out. It is drawn first in an upper, then in a lower chamber. The first arc generates gas to create pressure on the oil, forcing it into the other chamber where it positions and snuffs out the second arc. The arc products are carried out through side vents and the dielectric strength of the gap is raised to the point where the arc cannot restrike. This unique principle assures low breaker maintenance . . . long breaker life . . . dependable system protection.

Ratings range from 69 to 230 kv, with interrupting capacity up to 5,000,000 kva. For details, write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60676

By drawing the power arc in a fiber chamber of limited cross section, the multi-flow "De-ion" grid controls the position, shortens the length, extinguishes the arc . . . quickly.

ARE YOUR BREAKERS KEEPING PACE WITH EXPANDING GENERATING CAPACITY?

In the next three years 15,000,000 kw will be added to American generating systems. Westinghouse can help you keep pace (in some cases) by boosting the interrupting rating of your present breakers . . . or in developing a planned schedule of replacement to meet today's and tomorrow's peaks.

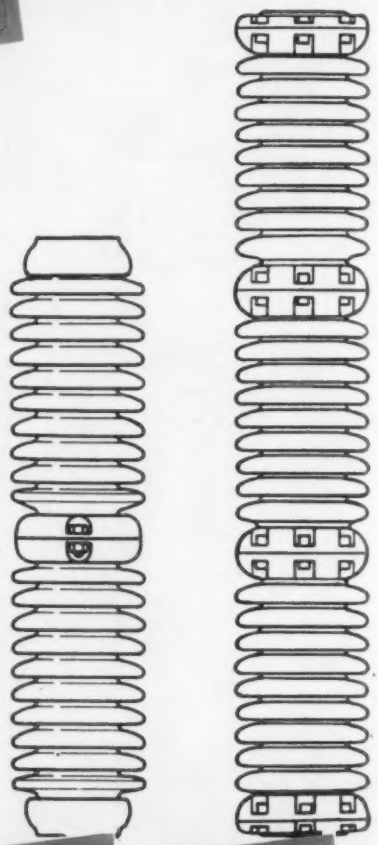
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

GM CIRCUIT BREAKERS

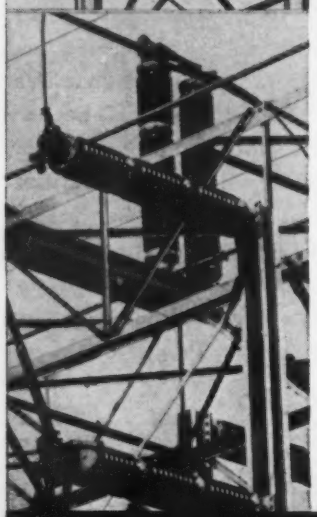
FOR SWITCH
AND BUS SUPPORT
AT 115-161 KV
LAPP STATION POSTS

● For more than 17 years the Lapp Post design has been proving its advantages in operation . . . in rigidity . . . in permanence . . . in superior performance under arcover . . . in elimination of puncture or cracking . . . in better operating characteristics under atmospheric contamination. The same advantages that have been so spectacular on the operating records of many power companies are even more significant at higher voltages. For new construction or maintenance of important high-voltage stations, investigate the advantages of the Lapp Post units shown at the right.



LAPP STATION POST 115 KV

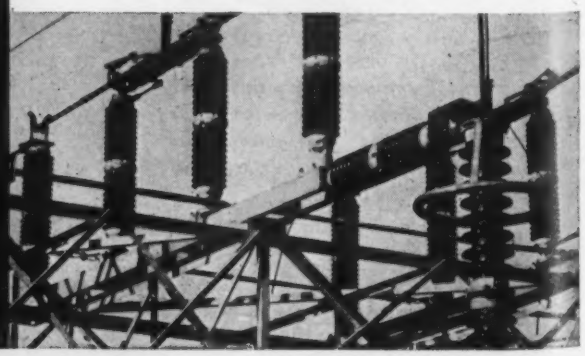
LAPP STATION POST 138-161 KV



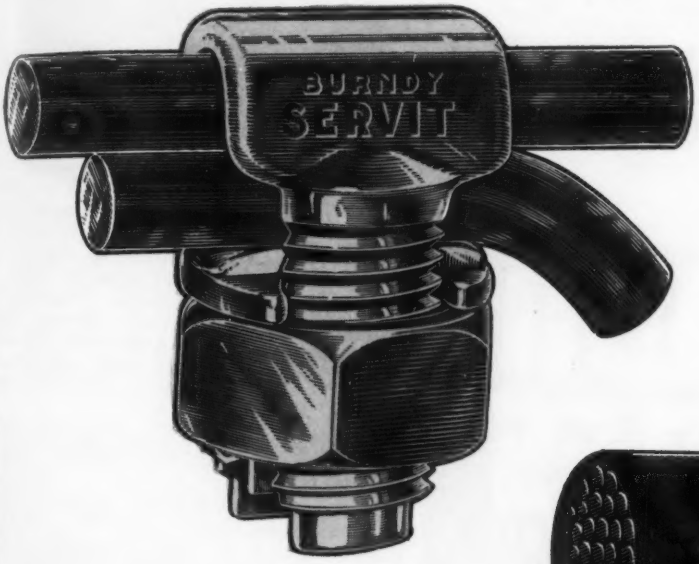
Lapp

STATION POSTS

LAPP INSULATOR CO., INC. • LE ROY, N.Y., U. S. A.

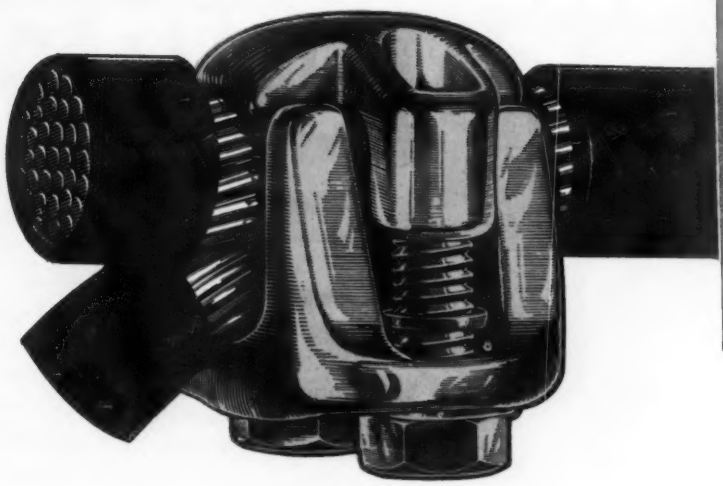


The *Leaders* in SERVICE CONNECTORS



Servit

—8 sizes for cables from #10 to 4/0



Oklip

—6 sizes for cables from 2/0 to 1000 Mcm.

BOTH LISTED UNDER REEXAMINATION SERVICE UL UNDERWRITERS' LABORATORIES, INC. *APPROVED*

These two popular Burndy service connectors *lead all others* by a wide margin at the point of sale, for the following reasons:

- *all sizes indicated are UL approved*
- *rounded corners and compactness make taping easy*
- *each size accommodates a wide range of conductor sizes*
- *both have the high strength and high conductivity found in all connectors of Burndy manufacture*

A free copy of the Burndy "SERVIT SELECTOR," convenient for selecting the right service connector, is yours for the asking.

Connect with

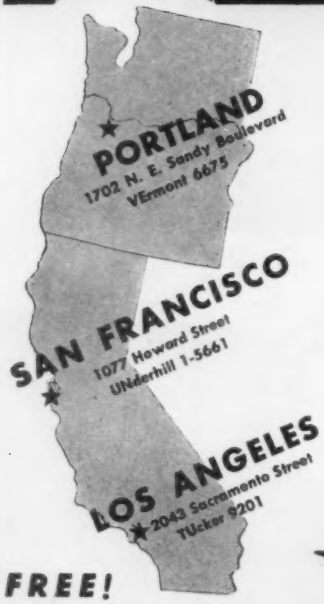
BURNDY

New York 54, N. Y.

WESTERN BRANCH: Vernon 11, California • CANADA: Canadian Line Materials, Ltd., Toronto 13
FOREIGN: Philips Export Corp., New York 17, N. Y.

IMMEDIATE SERVICE
ON ALL
YOUR MOTOR REPAIR MATERIALS AND TOOLS

INSULATION AND WIRES
INCORPORATED

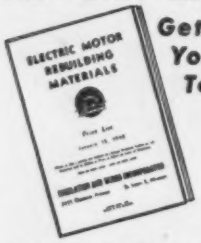


Letting IWI handle all your needs is like having a completely stocked warehouse right next door. IWI means no time wasted in waiting — no separate orders to many suppliers — no extra shipping or handling costs. Get what you want *fast,* with *one order* and *one delivery.*

All IWI repair shop items are nationally known and service proved. Every one is guaranteed to be of highest quality. Specially trained IWI field service representatives are ready to help you. Depend on them without obligation.

Call on IWI for Service!
Depend on IWI for Quality!

FREE!
IWI Blue Catalog
Get Yours Today!



IN STOCK—READY TO SHIP

Magnet Wire
Motor Lead Wire
Bearings
Insulating Paper
Fibre
Bakelite
Fibre Wedges
Wood Wedges
Cotton Tape
Commutators
Varnished Cambric Products
Saturated Sleeving
Insulating Varnish
Built-up Mica Products
Asbestos Insulation
Woven Glass Insulation
Pressure Sensitive Tape
Cotton Sleeving
Carbon Brushes

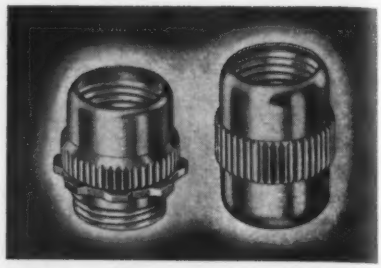
INSULATION AND WIRES SERVICE

More than 15 years experience helping repair shops do a better, more profitable job.

OTHER IWI WAREHOUSES ARE LOCATED IN...
ATLANTA DETROIT NEW YORK
BOSTON HOUSTON ST. LOUIS

IWI SALES OFFICES
ADRIAN, MICHIGAN FORT WORTH PHILADELPHIA

Fitting Line (1013)

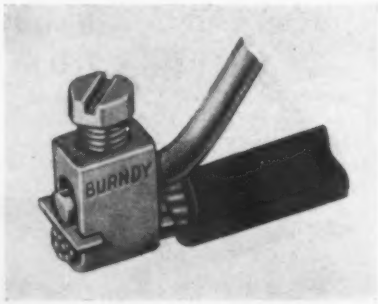


Briegel Method Tool Co. has announced a new self-threading fitting line for E.M.T. thin-wall conduit. These one-piece, cadmium-finished, steel fittings have a tapered thread that acts as a die, cutting its own threads on the tubing when screwed into locking position. The thin wall is pushed into the connector or coupling and given two turns with a pair of pl'ers to make a raintight, threaded connection claimed to withstand the most severe pull tests and give a positive ground. Approved by Underwriters' as raintight; furnished with course knurled grips, may be secured with hex grips if preferred.

Split Couplings (1014)

O. Z. Electrical Mfg. Co. has added three split couplings to give a complete line ranging in conduit size from the ½-in. to 5-in. The company introduced the split coupling several years ago as a replacement for the 3-piece coupling and recommends it particularly for connections in cramped space. The coupling is of one-piece, malleable-iron construction.

Connector (1015)



Burndy has announced a new Buttin for connecting copper and aluminum conductors at service entrances. The tin-plated cooper alloy body makes this connector suitable for both aluminum and copper. A pressure bar, also tin-plated, prevents contact of dissimilar metals and distributes the screw pressure so as to minimize cold flow of the aluminum conductors beneath it. The universal Buttin is similar in both design and appearance to the manufacturer's Buttin connector for copper service.

Reversing Contactor (1016)

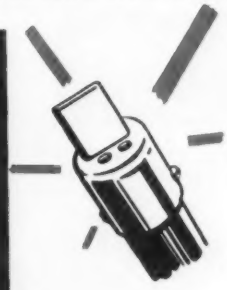
Square D has a compact a-c and d-c reversing contactor designed to control small motors used with small hoists, overhead doors, monorail cranes, mechanical speed changers and other intermittent-duty operations. Suitable for a-c polyphase motors rated at not more than 1 hp. and a-c single-phase and d-c motors of not more than ¾ hp.

What's your score?

(A three-minute test on the effective use of wiring materials)

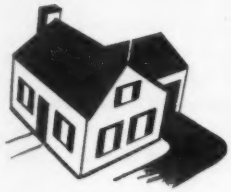
1 Existing service entrance consists of ¾-inch conduit containing two No. 8 Type R wires. How can this installation be made suitable for an electric range without tearing out the conduit?

A — *Install a second service entrance.*
B — *Run two No. 6 Type T wires and one bare No. 8 conductor in existing conduit.*
C — *Tap into the next door neighbor's circuits.*



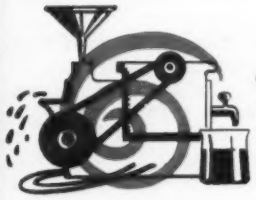
2 Why are fuse contacts sometimes silver-plated?

A — *Silver provides unusually fine conductivity.*
B — *Silver contacts cannot arc.*
C — *They look better with silver.*



3 Many electricians are saving time in box installations on residential wiring jobs. How are they doing this?

A — *By using precut wooden spacers.*
B — *Through the use of S-type bar hangers.*
C — *By nailing boxes directly to the plaster.*



4 A million feet of what famous wire was used in what fabulous machine and by what university?

A — *Deltabeston**
B — *The Navy's Mark II calculator*
C — *Harvard University*

Answers

1 Okay, if you chose *B*. And you'll be wise to make it General Electric thermoplastic every time you choose a building wire, because General Electric has always been a leader in the production and sale of thermoplastic-insulated wire.

2 Make it *A*, because silver oxide has the unusual property of reverting to pure silver when it gets hot. Silver-plated contacts eliminate premature blows from heating due to oxidation. That's one reason why G-E Silvend fuses are so efficient, regardless of how long they remain in service.

3 Pick *B* for this one. G-E S-type bar hangers are made to fit framing spaced from 6 to 24 inches. A new, heavy-duty stud affords ample support for any modern fixture.

With a G-E S-type hanger, a box can be located on the bar at any point between studs simply by tightening a single screw.

4 It takes *A*, *B*, and *C* to run up a score on this one, because they're all correct. We put them all in, because it is a pretty good testimonial to the reputation of heat-resistant General Electric Deltabeston. Users everywhere will agree.

We hope this little quiz was fun. And maybe it will help to give you a better picture of G-E Construction Materials—the full line for all wiring needs. Each part of the line is made for ready use with other G-E wiring materials. It's a line that has been designed for your convenience—in ordering—in installation—and in maintenance. And it is backed up by experienced men who are always ready to help you with engineering and application counsel on your every job. It's the kind of *one source, one complete line* service that makes it easy for you and your customers to do a top-notch wiring job. If you want information on any of our products, please write to Section 7-1025 General Electric Company, Bridgeport 2, Connecticut.

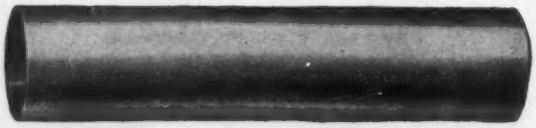
* Trade-mark Reg. U. S. Pat. Off.

Construction Materials

GENERAL ELECTRIC

G&W SPLICING KITS *UNIT PACKAGES* for Better Cable Joints

Kits include each necessary item of material in the correct grade and proper quantity for making a cable joint of our standard design (or your own design or special type.)



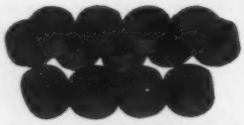
LEAD SLEEVES—for housing the joint, cut from commercially pure lead tubing, drifted to exact size and diameter to dimensions as required.

COPPER CONNECTORS—for joining the conductors, made in accordance with electrical industry standards.

SOLDER—for making wiped joints and soldering the connectors. Standard 60-40 grade (60% lead, 40% tin) is furnished in 1 lb. pigs. (In case of restrictions on the use of tin content, No. ST30H grade is used—30% tin, 1¼% silver, 2% antimony, 66¾% lead.)

50-50 solder is furnished in 1/6 lb. bars for convenience in sealing filling holes in the lead sleeves.

VARNISHED CAMBRIC TAPE—Bias cut, for insulating the joints. Furnished in handy 4-yd. rolls, ½", ¾" and 1" wide. *Dry packed,* paraffin dipped, for joints operating up to 15 Kv. grounded neutral or 12 Kv. ungrounded neutral. *Oil packed,* in sealed metal cans for joints operating at higher voltages.



4 yd. rolls are handy to apply.

V. C. TAPE, straight cut, in 4-yd. rolls, 3/16" wide (dry or oil packed), is furnished for filling spaces at ends of connectors.

STEARINE—soldering flux, double pressed grade, in convenient candles weighing two ounces.

PAPER PASTERS—for limiting the wipes, cut from gummed paper, 2" by 15" strips, packed in moisture proof envelopes.

INSULATING COMPOUND—for filling the lead sleeve. OZITE "B", a plastic asphaltic base compound with suitable melting point, high dielectric strength and low dielectric loss. (Novoid "X" oil insoluble compound furnished when so specified.)

COTTON TAPE—for cleaning connectors, protecting and securing cable insulation, also for temporary lashings.

OTHER MATERIALS such as Flushing Compound, Copper Tinsel Braid, Saturated Webbing and Flax Twine are furnished when required by the type of joint.

Advantages of Using G & W Splicing Kits—

- Each item was supplied in the correct quantity for a properly designed joint.
- Time and expense of securing various items from different sources is saved.
- Accumulation of dead stock is avoided. No waste.
- All materials are kept clean and ready for use.
- Each Unit Splicing Kit is labeled for easy identification.

G & W Splicing Kits are furnished for ALL types of cables and ALL kinds of joints, (except high voltage oil and gas filled.) The following bulletins will be sent on request.

BUL. CJ1 lists 2 way-Var. Cam., Leaded, 1/c and M/c Belted.
BUL. CJ2 lists 2 way-Var. Cam., Leaded, 3/c Shielded.
BUL. CJ3 lists 2 way-Paper, Leaded, 1/c and M/c Belted.
BUL. CJ4 lists 2 way-Paper, Leaded, 3/c Shielded.
Bul. (None).....Rubber, Leaded and Non-leaded.
Bul. "CJT" lists.....Telephone and Signal Cables.

Standard and special 2 way, 3 way Y and 4 way cable splicing kits are quoted on request.

PLEASE GIVE COMPLETE CABLE DATA

(Fully describe cable, give operating voltage and state whether grounded or ungrounded neutral.)

Type "SPS" Insulating Sleeves

Porcelain insulator is soldered into lead sleeves by means of a special technique developed by G&W. Available in diameters from 1 to 4½ inches.

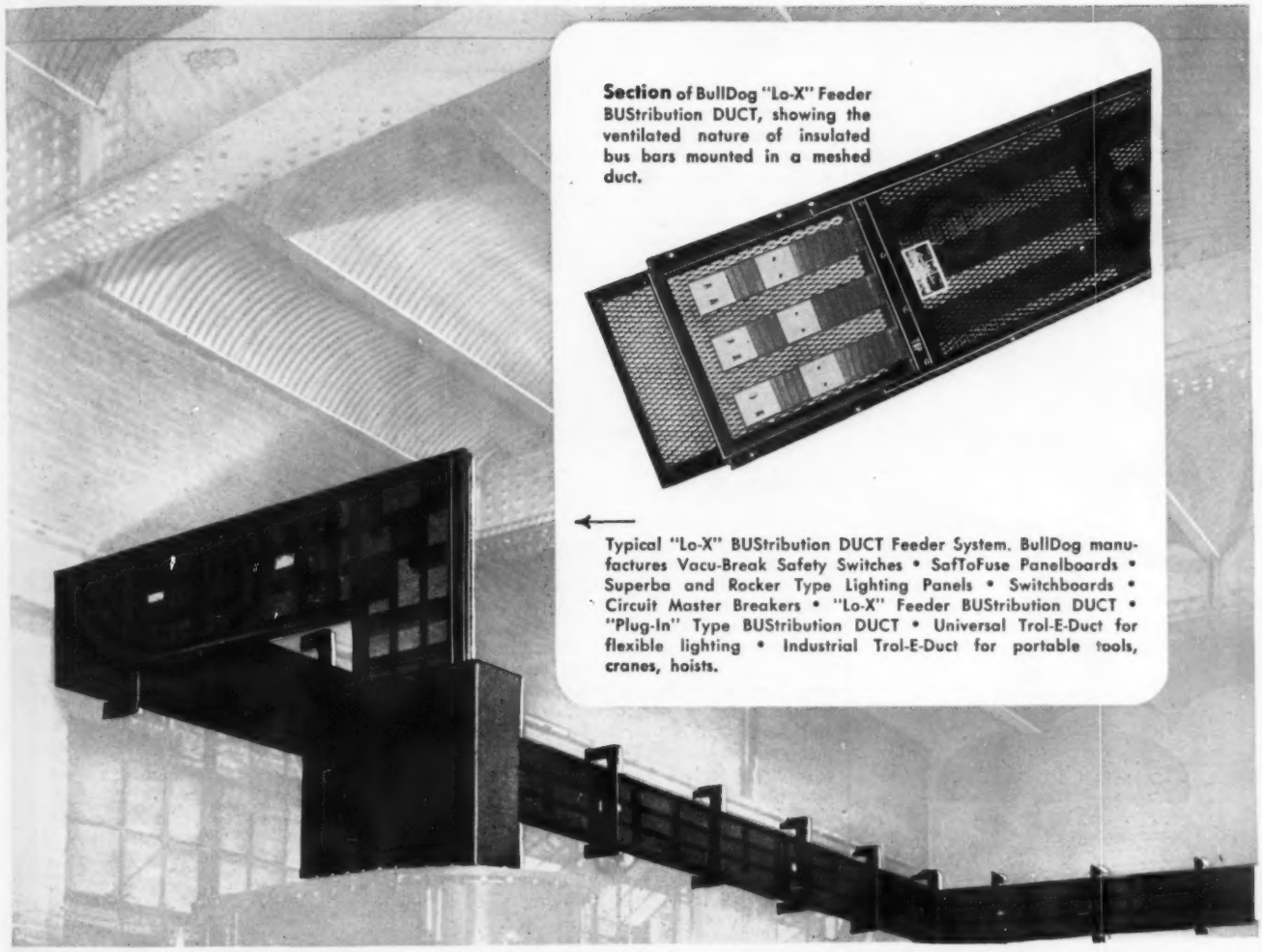
Representatives in principal U.S. cities. In Canada, Powerlite Devices, Ltd., Toronto.

G&W ELECTRIC SPECIALTIES

Originators and pioneers of equipment for sound methods of underground and overhead electric distribution.

G&W ELECTRIC SPECIALTY CO.
7780 DANTE AVE., CHICAGO 19, ILL., U.S.A.

Potheads . . . Boxes . . . Oil Fuse Cutouts . . . Oil Switches . . . Multitaps . . . Splicing Kits



Section of BullDog "Lo-X" Feeder BUStribution DUCT, showing the ventilated nature of insulated bus bars mounted in a meshed duct.

Typical "Lo-X" BUStribution DUCT Feeder System. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution DUCT • "Plug-In" Type BUStribution DUCT • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

How to make power toe the line

BRING electricity into line the modern, efficient way with BullDog "Lo-X" BUStribution DUCT.

The ventilated casing and bus bar arrangement of "Lo-X" BUStribution DUCT make it carry electricity more efficiently. Ventilation beats conductor heating by dissipating heat into the air. Closely spaced paired-phase bus bars hold voltage drop to a minimum by reducing reactance. Resulting full power and low temperature rise assure peak efficiency of electrical equipment.

Long, efficient life

Conductors in "Lo-X" Duct use air as their main dielectric. They are mounted on porcelain insulators and individually wrapped with insulating tape to prevent the possibility of electrical failure. This means a long, efficient life for your electrical system.

"Lo-X" Duct comes in standard, prefabricated ten-foot lengths, in capacities up to 4000 amperes . . . adaptable to almost any industrial power distribution need. Standardization and prefabrication means *known* performance, even before installation. Also means complete salvability of your system in event of plant changes.

Remember this: Underpowered equipment means poor performance. Your feeder system may be costing you dollars . . . *right now.*

Get technical details from a nearby BullDog Field Engineer. He'll gladly answer your questions and show you a typical installation near your own plant.

BullDog's Field Engineers welcome the chance to sit in on planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation and maintenance costs, as well as highest efficiency and reliability in actual operation. Why not take advantage of this pre-building service?

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

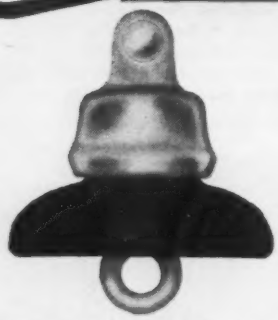
CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N. E. Sixth Avenue Tel. Garfield 2844
Portland 12, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.

...for all
HIGH VOLTAGE NEEDS
call
Porcelain Products



Rugged 6" Suspension Insulators—compression glazed for extra mechanical strength. Designed to withstand strain of wind and ice loads.

Pintypes that take a load off lineman's shoulders. Can be furnished with Type "N" radio interference eliminating glaze.

Rugged metal-reinforced wireholders with well rounded wire ways, heavy galvanized steel strap. Semi-float self-aligning action assures proper seating.

SEND YOUR INQUIRY TO

Porcelain Products, Inc.
PARKERSBURG, W. VA.

Service Drop Cable (1017)

RoPrene service drop cable, a new 600-volt service cable of the self-supporting type, is being manufactured by Rome Cable Corp. For 3-wire service, this cable is made up of two power conductors of stranded soft-drawn copper insulated with a heavy wall of RoPrene (Neoprene), twisted around a bare neutral of hard-drawn copper, which serves as a supporting messenger. Tests indicate that it withstands a continuous a-c potential of 4,800 volts between insulated conductor and ground electrode for a minimum of 4,000 hours without failure, after subjection to 100 hours of the Weather-O-Meter cycles. Available at present in sizes 8, 6, 4 and 2 AWG. In localities where a bare neutral is not permitted, substitution of solid hard-drawn double braid weatherproof wire is recommended by the manufacturer.

Plug-In Strip (1018)

National Electric Products Corp is offering a plug-in strip featuring a solid continuous copper conductor system and simplified installation without disassembly. The strip is available in two lengths and two receptacle spacings. The 6-ft. lengths have outlets 6 or 18 in. apart. The 3-ft. length has outlets every 6 in. Ten matching fittings are available, including exterior, interior and flat elbows; center and end feeds, and blank "fill-in" strips for placement in inaccessible places. The two No. 12 AWG copper conductors have been factory-wired into the 24-gage steel channel, which has a permanently locked-in capping. When full or part lengths are joined in an installation, a copper barrel connector is crimped over the conductor ends. Finished in a satin grey, the strip can be painted if desired.

Metal Ribbon Products (1019)

Sylvania has announced metal ribbon products suitable for electronic and instrument parts, metal fabrics, coaxial cable, jewelry, etc. The formed metal ribbons are produced by rolling and drawing nickeled steel; stainless steel; copper-clad steel; inconel; copper; beryllium copper; phosphor bronze; brass and aluminum. Available shapes, up to ⅛ in. wide, include channel, square, rectangular, ¼ round, ½ round and flat ribbons in wide range of thickness and special shapes.

Cable Connector (1020)

A non-metallic sheathed cable connector for electrical outlet boxes has been added to the Allied Electric Mfg. Corp. line. Called the Paige No. 52, this connector is made of spring steel and plated against corrosion. No special tools are required for installation.

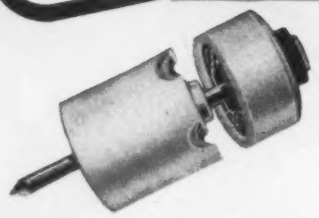
Tubing (1021)

Extruders Inc. has developed a lightweight tubing for insulation and sheathing. It is made of Vinylite brand compounds and is known as Insulite tubing. It is available in clear, black, white, blue, green, red or yellow.

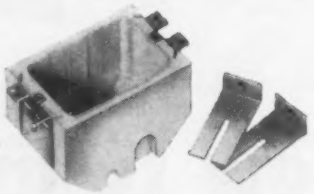
D-C Relay (1022)

The new Type J d-c relay manufactured by C. P. Clare & Co. is available in plug-in type. Supplied with standard octal base plug; over-all length, 3⅝ in.; length of relay installed, $2\frac{15}{16}$ in. from the panel.

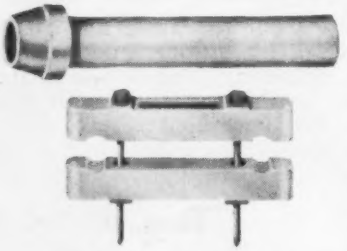
...and for
LOW VOLTAGE TOO!
call
Porcelain Products



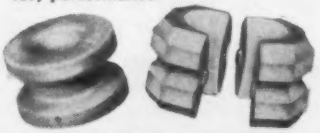
Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.



Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.



A complete size range of tubes as well as 2 and 3 wire cleats are available for immediate delivery. Made precisely to give long and satisfactory performance.



Both round and oval type split forestry insulators as well as telephone insulators are available for immediate delivery.

SEND YOUR INQUIRY TO

Porcelain Products, Inc.
FINDLAY, OHIO

"JOB PROVEN" THE WORLD OVER Nicopress

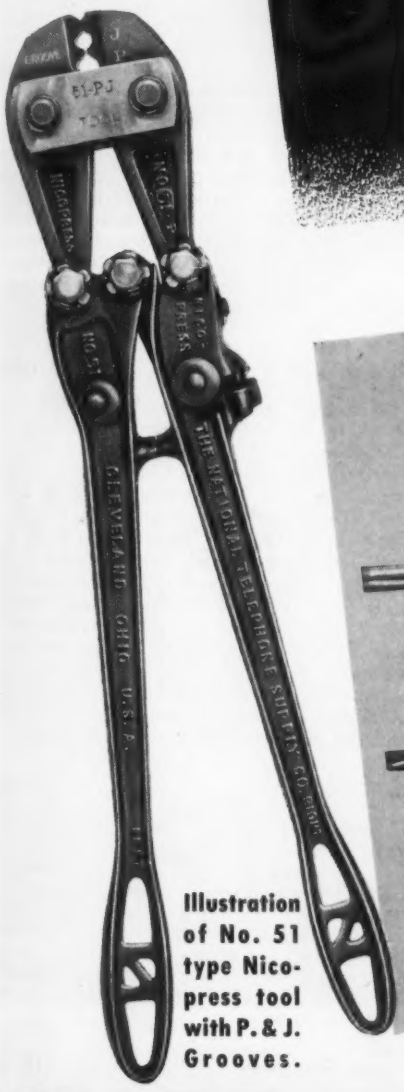
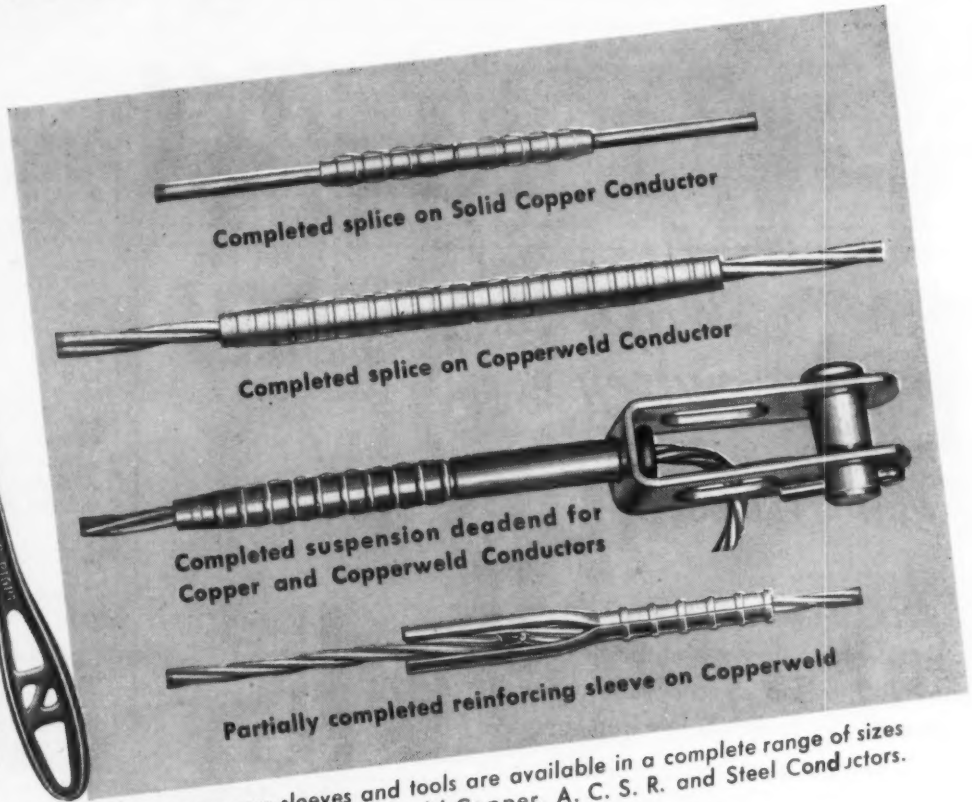


Illustration of No. 51 type Nicopress tool with P. & J. Grooves.


Completed splice on Solid Copper Conductor
Completed splice on Copperweld Conductor
Completed suspension deadend for Copper and Copperweld Conductors
Partially completed reinforcing sleeve on Copperweld

Nicopress sleeves and tools are available in a complete range of sizes for Copper, Copperweld-Copper, A. C. S. R. and Steel Conductors.

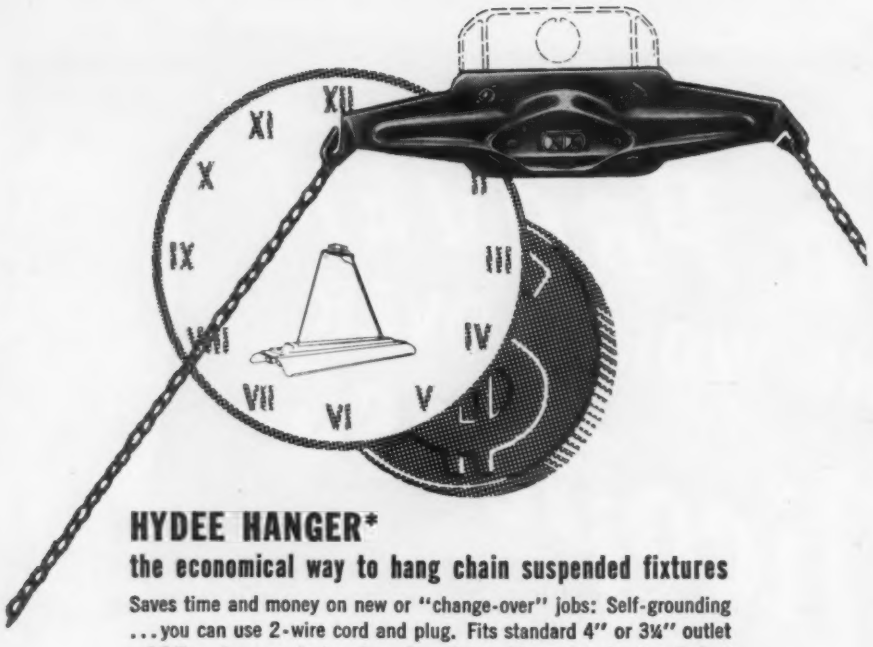
The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY



HYDEE HANGER*

the economical way to hang chain suspended fixtures

Saves time and money on new or "change-over" jobs: Self-grounding ...you can use 2-wire cord and plug. Fits standard 4" or 3¼" outlet box or plaster ring. **Complete** with receptacle, two 5-foot chains, spring wire "S" hooks and cord clips.

$1.65 LIST

Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

012

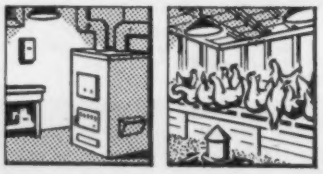
IT'S EASY TO SEE WHEN IT'S **DAY-BRITE** *Lighting*

*Patent No. D-141084 and No. 440914
Underwriters approved.

SWITCH "ON" • REGULARLY
• AUTOMATICALLY
SWITCH "OFF" • ELECTRICALLY

WITH A FAMOUS **TORK** TIME SWITCH
PLAIN OR ASTRONOMICAL

Tork Clock Time Switches are world renowned for their dependability and accuracy. They require no regular attention, and are available in many electrical capacities for both indoor and outdoor use.



There's a TORK CLOCK for every need. Economically priced from *Send for free literature.* **$9.50**

TORK CLOCK CO., Inc.
1 GROVE ST., MOUNT VERNON, N. Y.

Coded Truck Units (1023)

Four Wheel Drive Auto Co. has announced 38 coded units based on three truck models in its standardization of motorized units for power and communication line construction and maintenance. Basic models recommended by the manufacturer for line construction are the HA for medium heavy duty; the HR for heavy duty and the SU for extra heavy work. All three models are available with standard or crew-type cab.

The HA series has eight codes equipped with derricks and boring machine and either

line body, combination platform and line or platform body and a choice of standard or crew-type cab. Four codes are listed with full-line bodies and derricks and a choice of crew or standard cab. The same range of selection is available for the HR and the SU line and in addition the latter model is equipped with a standard cab and the heavy-duty earth boring machine with integral derrick and the same boring machine mounted on an SU with a crew-type cab.

Pipe Straps (1024)

Minerallac Electric Co. has added two items to its line—two-hole pipe straps of zinc-plated steel and perforated strap of electrogalvanized steel. The former are designed to give perfect alignment, to hold the pipe or conduit firmly and to support heavy loads. The perforated strap is ¾ in. wide by 18 gage with ¼-in. holes and ½-in. centers. This strap can be furnished in coils or in straight lengths. Stock lengths are 5 and 10 ft., but other lengths are available. It will support pipes, cables and conduits up to a safe load of 500 lb., the announcement states. Both items are available also in everdur, copper or aluminum and the perforated strap comes in brass.

Pole Digger (1025)

Minnetonka Mfg. Co. has announced the Tel-E-Lect pole digger which attaches to a line truck with one bolt. It works suspended from the derrick and is raised and lowered by the winch line. It is powered by the truck motor through a power take off. It is claimed that two men can drill a hole in five minutes or less with the device, which is adjustable to 8 ft. deep and has interchangeable augers from 9 to 16 in.

Metal Raceway (1026)

Wiremold's Plugmold Jr. is a 30-in metal raceway complete with three standard receptacles and 6-ft. cord and plug. Prewired, ready for plugging into an existing outlet, unit is attached to surface by means of two wood screws.

Plug-Type Terminal (1027)

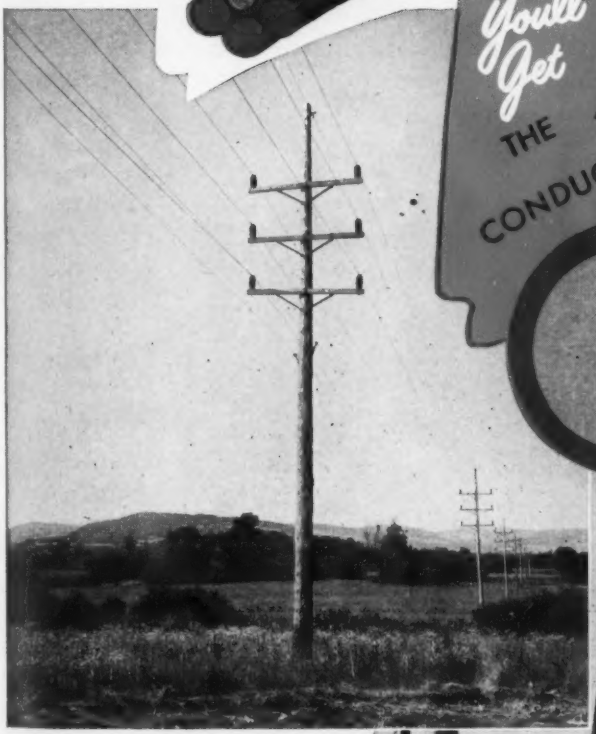
Aircraft Marine Products Inc. has a new plug-type terminal for 16-14 wire size. Trademarked "shur-Plug," these terminals are crimped with AMP No. 49218 or 49111 tools.

If You're

PLANNING A TRANSMISSION LINE--

Specify **Copperweld** TRADE MARK

- POWER CONDUCTORS
- OVERHEAD GROUND WIRE
- GUY STRAND
- COUNTERPOISE WIRE
- GROUNDING WIRE
- GROUND RODS AND CLAMPS
- ANCHOR RODS
- NAILS AND STAPLES



You'll Get THE CONDUCTIVITY and PERMANENCE OF COPPER *Plus* THE STRENGTH AND RUGGEDNESS OF STEEL

COPPERWELD STEEL COMPANY

Glassport, Pa.

SALES OFFICES: ATLANTA · CHICAGO · CLEVELAND · DALLAS · MEMPHIS
NEW YORK · PITTSBURGH · SAN FRANCISCO · ST. LOUIS

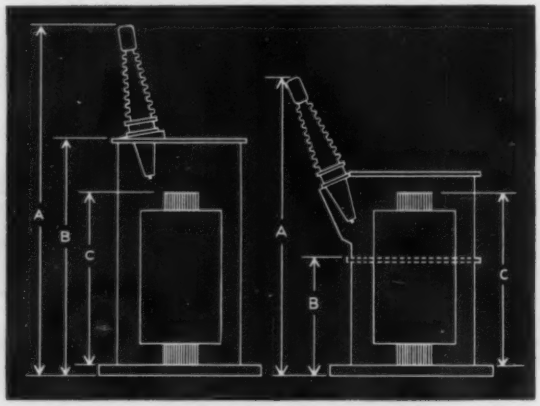
Another
MOLONEY TRANSFORMER
designed to fit the job

This 33,333 Kva transformer was designed to meet the customer's requirement that the overall height be restricted to a certain figure, and that untanking be possible without changing existing crane facilities having limited clearance.

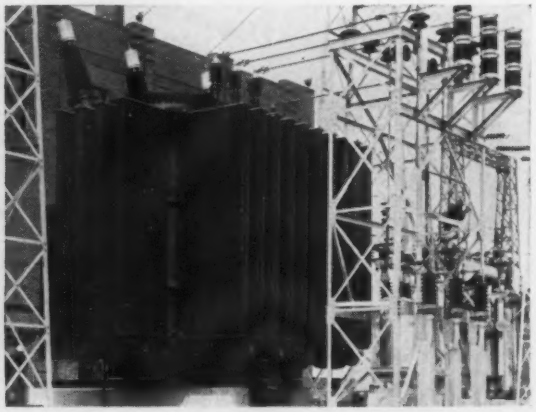
Moloney engineers solved the problem of reducing the overall height of the transformer by attaching bushing ports to the side of the tank to eliminate the space usually required for the shanks to extend below the cover.

They also reduced the untanking height by splitting the tank near the middle so that after the removal of the top tank section, the core-and-coil unit could be lifted out of the relatively short lower section.

Moloney can solve your transformer problem, too, using the experience gained in over 50 years of specialization in the manufacture of transformers.



At left, normal design. At right, special design. Note that overall height (A) and untanking height (B plus C) are materially less in the special design.



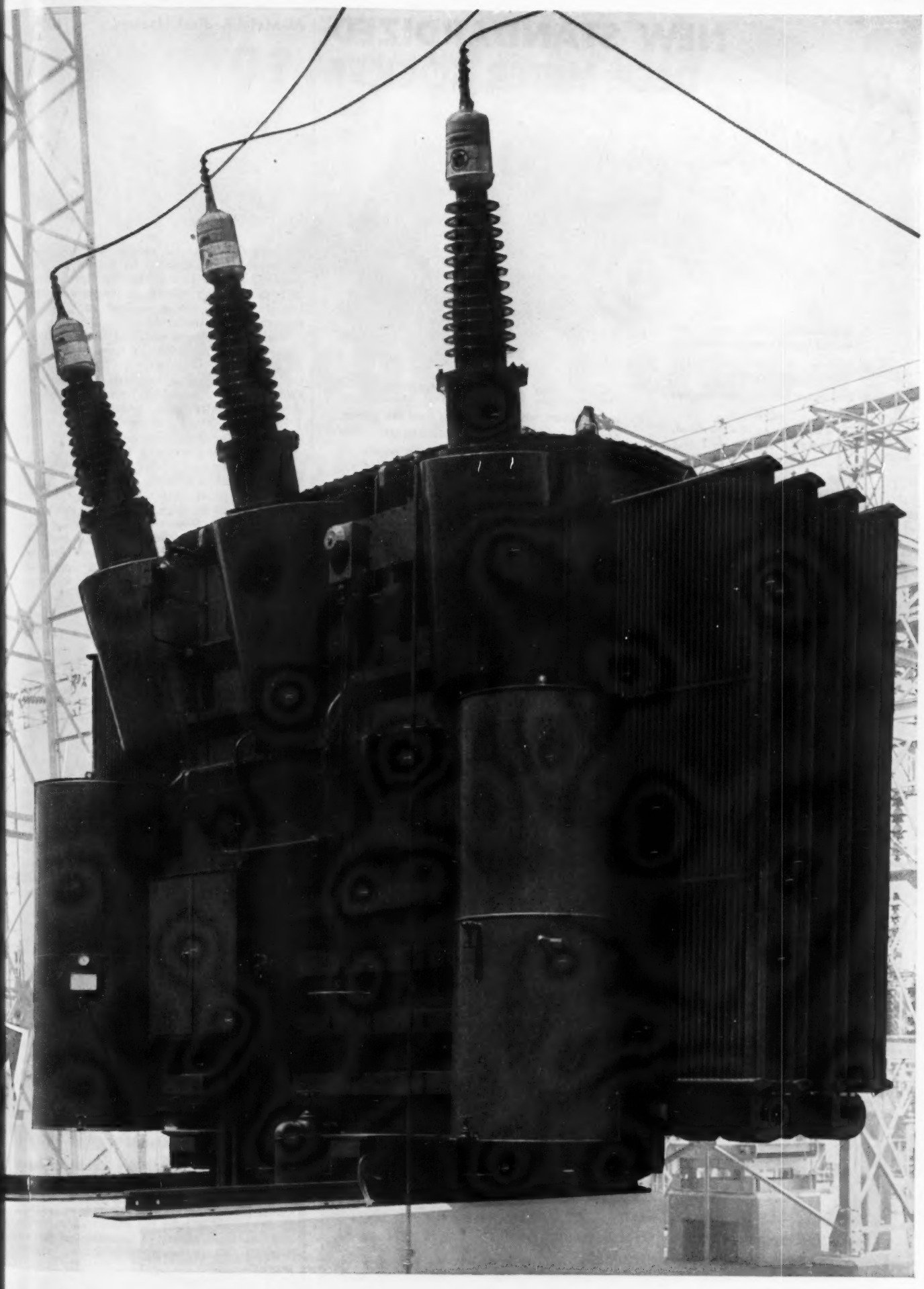
Transformer shown: 33,333 Kva, 3 phase, 60 cycles, 132,000 Delta to 34,500 Y/19,920 volts. Impedance 8.5%. Supplied with Gas-Oil Seal protective equipment. Total weight 227,000 pounds. Above: View of Low Voltage side. Right: View of High Voltage side.

MOLONEY ELECTRIC COMPANY

Factories at

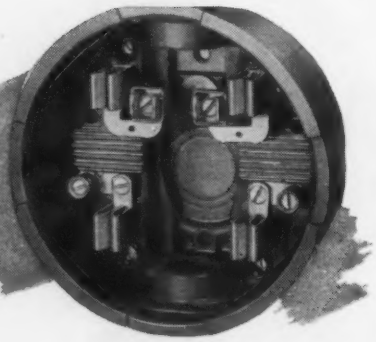
ST. LOUIS, MISSOURI AND TORONTO, ONTARIO, CANADA

POWER AND DISTRIBUTION TRANSFORMERS EXCLUSIVELY SINCE 1896



NEW STANDARDIZED DEEP METER SOCKET

Low price plus these advantages...



1. Additional wiring space for more liberally rated conductors
2. Greater ease of connecting larger conductors
3. Increased current-carrying capacity
4. New and improved all-welded, one-piece, stainless steel ring
5. Snap-action, quick-hitch ring that requires no tools for installation
6. Benderized plus baked-on aluminum paint for increased corrosion resistance and longer life
7. Two-way ($3.00 list) three-way ($3.85 list), subject to change without notice.

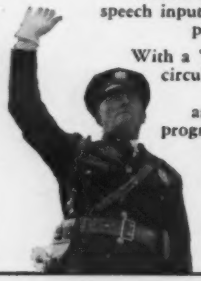
This new type R-1 four-terminal standardized socket covers with one catalog item the widest practicable range of applications and ratings for single-phase metering. It reduces the number of items to be stocked, increases interchangeability, and provides for future growth.

Detailed specifications and prices are available from your nearest G.E. representative. Consult him today, or write for Bulletin GEA-5147. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

601-42

Radio "traffic cop" with a good heart!

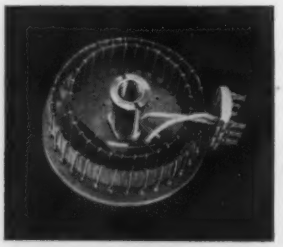


Operating where audio frequencies crowd the thoroughfares, variable attenuators assure precision volume control in speech input equipment for radio consoles, sound motion pictures, public address systems and television.

With a "traffic cop" of this type in each microphone circuit of a multi-microphone setup, input volume of one unit can be faded out while that of another is increased; close-up and background program effects can be reproduced with any degree of contrast desired; and the resultant mixing of all microphone inputs can be smoothly handled, through a master gain control, to meet all variations in program tonal intensity.

To assure top-level performance, the maker, Daven Company of Newark, N. J., specifies that *all* its resistors—"standards in the industry"—be wound with Nichrome® V, Nichrome®, D-H Manganin, or D-H 331 Alloy wire, dependent upon application.

If *you* require electrical resistance wire of outstanding uniformity and high stability, be guided by the example of Daven and send your specifications to us. We will supply the alloy best suited to your needs.



Dependable "heart" of Daven attenuators is Driver-Harris electrical resistance wire.

Driver-Harris Company

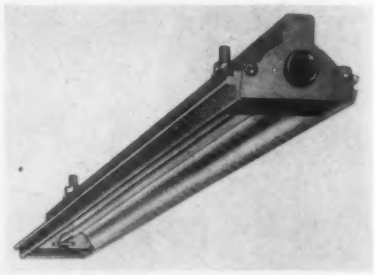
Stocked for the Coast Trade at: ANGUS-CAMPBELL, INC.

235-241 San Bruno Ave., San Francisco • 449 So. San Pedro St., Los Angeles • 2122-4th Ave., Seattle

Main Office and Plant: HARRISON, NEW JERSEY

®T. M. Reg. U. S. Pat. Off.

All-Metal Radiant Heaters (1028)



Chromalox all-metal electric radiant heaters have been announced by Edwin L. Wiegand Co., for drying, baking, preheating and dehydrating where a longer-wave infrared heat source is desired or glassless construction is preferred.

High-temperature enclosed-type heating elements are mounted at the focus of a parabolic reflecting surface. According to the manufacturer, a negligible amount of visible light is produced from the Inconel-sheathed tubular unit, which operates at 1,000° to 1,400° F., depending upon wattage. Ambient temperatures of 400° F. or higher are permissible.

Interlocking and sliding-bolt features are said to permit maximum flexibility in fabricating groups of heaters into patterns. Assemblies are 4 in. deep, allowing heat source to be brought close to work. Heating elements of same or different wattage may be changed on the job. Standard body lengths are 25, 31 and 47 in. with heated lengths of elements, 17, 23 and 39 in. Various wattages are available.

Yard Light Control (1029)

The M. B. Austin Co. has introduced a new remote control switch for yard lights, machines, pumps, motors, etc. Known as Remotrol, it is designed for use with any desired number of momentary contact switches and eliminates need for 3- and 4-way switches. It is built for indoor or outdoor use, consists of a solenoid plunger-type ratchet switch which is energized by operating a momentary contact switch. This action indexes the switch mechanism to complete the circuit. Circuit remains on, even though not energized, until one of the momentary switches is operated again. Having once more become energized, solenoid moves the ratchet and breaks the circuit. The unit carries a replaceable 15-amp. Fustat protected by a spring-hinged cover.

Lamp Changer Pole (1030)

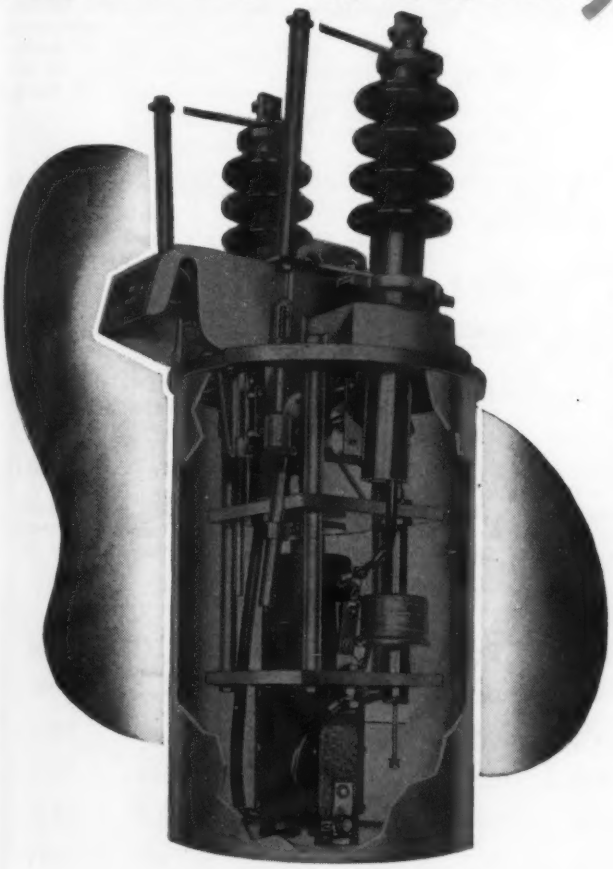
McGill Mfg. Co. has announced an improved pole for its adaptable lamp changers. This new lightweight steel pole is furnished in 5½-ft. interchangeable sections and is so designed that sections may be joined together to provide the necessary length for replacement or removal of light bulbs up to a recommended limit of 30 ft. Sections are locked together by a spring-actuated button. Each section is insulated.

Lampholder Adjusters (1031)

Spring-action lampholder adjusters have been announced by Allied Electric Products, Inc. In the patented design, "feet" of the nickel-plated steel adjusters act as permanent wedges to hold the lampholder rigidly and conteract effects of vibration or fixture warpage. Come complete with two staked screws.

The New, Improved KEARNEY Automatic Oil Circuit Recloser

received Industry-Wide Approval



because of these PLUS Features - -

- Oversize 6½ Gallon Oil Tank
- Heavy Double Arc-Resisting Alloy Contacts
- Two Full Rated 15,000 Volt Bushings
- Choice of Operation Sequences — 4 Fast to 4 Slow, or Any Combination of Fast and Slow
- Operation Sequence Is Easily Changed by Shifting of a Single Cam

The OCR of Tomorrow—Available Today

Immediate Shipment from Stock

Always Specify KEARNEY PRODUCTS *for the Job*

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

4224-42 CLAYTON AVE. – ST. LOUIS 10, MISSOURI

Canadian Plant, James R. Kearney Corp., Ltd., Leaside, Ontario, Canada

West Coast Distributor: **MAYDWELL and HARTZELL,** INC.

UP
GOES MOTOR PERFORM-ANCE
DOWN
COMES MAINTE-NANCE COSTS
with
OHIO
MOTOR
BRUSHES

As a basic manufacturer for the past 30 years our organization has been dedicated to the task of designing and manufacturing reliable quality generator and motor brushes. Throughout all industry Ohio Carbon brushes have set a standard for dependability. Keep a stock of them on hand and *you will have efficient motor performance at your fingertips!*

Send for

Our Reference Book in your category:— Industrial, General Purpose, Mining, Welding, Refrigeration, Appliances, Transportation, Carbon Specialties.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St., Los Angeles, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

BULLETINS ETC.

Electrical Tapes (1032)

Scotch brand electrical tapes are described in a 24-page catalog prepared by Minnesota Mining & Mfg. Co. This catalog contains photographs of electrical tape applications, describes the tapes and tape research and includes a discussion of electrolytic corrosion. Tape properties are listed, including backings, thickness, tensile strength, elongation, adhesion, insulation resistance, dielectric strength and electrolytic corrosion factor for each tape.

Ohmmeter (1033)

James G. Biddle Co. has released a bulletin on the Ducter low-resistance ohmmeter. Subjects include electrical maintenance tests of cable and connector joints, oil circuit breaker assemblies, rotating equipment, transformers and coils and test for controlling manufacturing and assembly processes.

Switch Template (1034)

A template for use of draftsmen and engineers in laying out switches and substations is available from Locke Inc. It contains outline drawings of all standard outdoor-type switch and bus insulators in all scales from 1½ in. to the foot to ¼ in. to the foot.

Conduit Fittings (1035)

Wagner Malleable Products Co.'s Catalog 483 covers its line of fittings for thin-wall conduit.

Industrial Lighting (1036)

Day-Brite has released Bulletin 30-A-2 covering the revised listing of its Day-line industrial system. The new Turret sockets and closed-end reflectors have been added to the 2- and 3-lamp 40-watt fixtures. Data Sheet 557 covers the company's continuous light strip equipment with and without reflectors for two rows of 40-watt F lamps and Data Sheet 559 continuous light-strip equipment with reflectors for 85-watt F lamps. Numerical Index 60-A-4 has been issued to replace 60-A-3.

Small Motor Brushes (1037)

A 44-page guide for users of fractional horsepower motor brushes offered by Stackpole Carbon Co. gives data for selecting and applying brushes for longer life and better performance on a variety of small-motor equipment and under different conditions.

Network Protector (1038)

Westinghouse describes its new CM-88 overhead network protector in a 24-page booklet A light-duty protector for 75- and 150-kva. transformers, the CM-88 permits application of a-c network systems in areas of lighter load density than heretofore served by the company's medium-duty CM-44 and heavy-duty CM-22.

Manufacturer's Story (1039)

"This is Wagner," a special edition of Wagner Electric Corp.'s house organ, tells the story of the company, its people, plants and products.

Motor Starter (1040)

Ohio Brass is offering a data sheet on its type BDG gas-proof, automatic motor starter.

Tin Content Indicator (1041)

Wheelco Instruments Co. is distributing literature on its recently announced model 2870 tin content indicator for solder.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

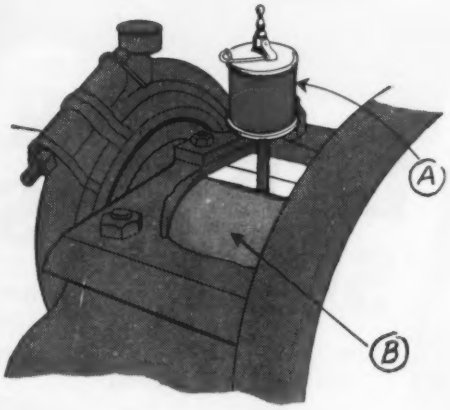
1000	1001	1002	1003	1004	1005	1006	1007
1008	1009	1010	1011	1012	1013	1014	1015
1016	1017	1018	1019	1020	1021	1022	1023
1024	1025	1026	1027	1028	1029	1030	1031
1032	1033	1034	1035	1036	1037	1038	1039
1040	1041						

Name . . . . . Company* . . . . . Title* . . . .

Address . . . . . .

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

CASE 1063—REDUCING CONSUMPTION OF OIL USED FOR GENERAL INDUSTRIAL LUBRICATION.



STEAM ENGINE MAIN BEARING

In severe lubrication conditions, such as in the main bearing of a steam engine, consumption of compounded Calol Red Engine Oil X was 20 to 30 percent less than that of straight mineral oil. It is recommended for all types of bearings except high-speed, flood lubricated, anti-friction bearings where pickup may be excessive. Comes in three grades: 13X, 16X and 26X.

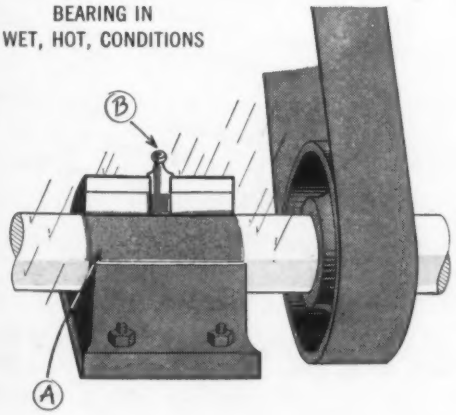
A. May be applied by all types of oiling systems - compounds promote better circulation in ring-, and chain-oilers.

B. Contains stringiness and oiliness additives. Forms tacky "oilskin" on bearings - resists heavy loads and high temperatures. Reduces friction, high starting torque and wear.

Calol Red Engine Oil X has excellent metal-wetting ability - protects metal against rusting even in high humidity conditions. Cools rapidly.

CASE 1070--LUBRICATING GREASE BEARINGS IN HEAT AND MOISTURE.

BEARING IN
WET, HOT, CONDITIONS



In a heavy water spray and high ambient temperatures, Calol W. P. Grease maintained good bearing lubrication for full lubrication periods. Very satisfactory on wicket gates of hydro-electric turbines, coal loader arms, hot bed and conveyor bearings in water conditions, cannery and bottle-washing equipment.

A. Extremely adherent to metal surfaces ... maintains tough lubricating film.

Calol W. P. Grease will not melt or dissolve in boiling water. Resists all heat in a peculiar manner - gradually softens over long range of temperatures instead of melting suddenly as most greases do.

B. Medium-bodied -- may be applied by grease gun or cup. Good pumpability in low temperatures.

Calol W. P. Grease contains no talc, resin, wax or other fillers.

Trademarks, "Calol," "RPM," Reg. U. S. Pat. Off.

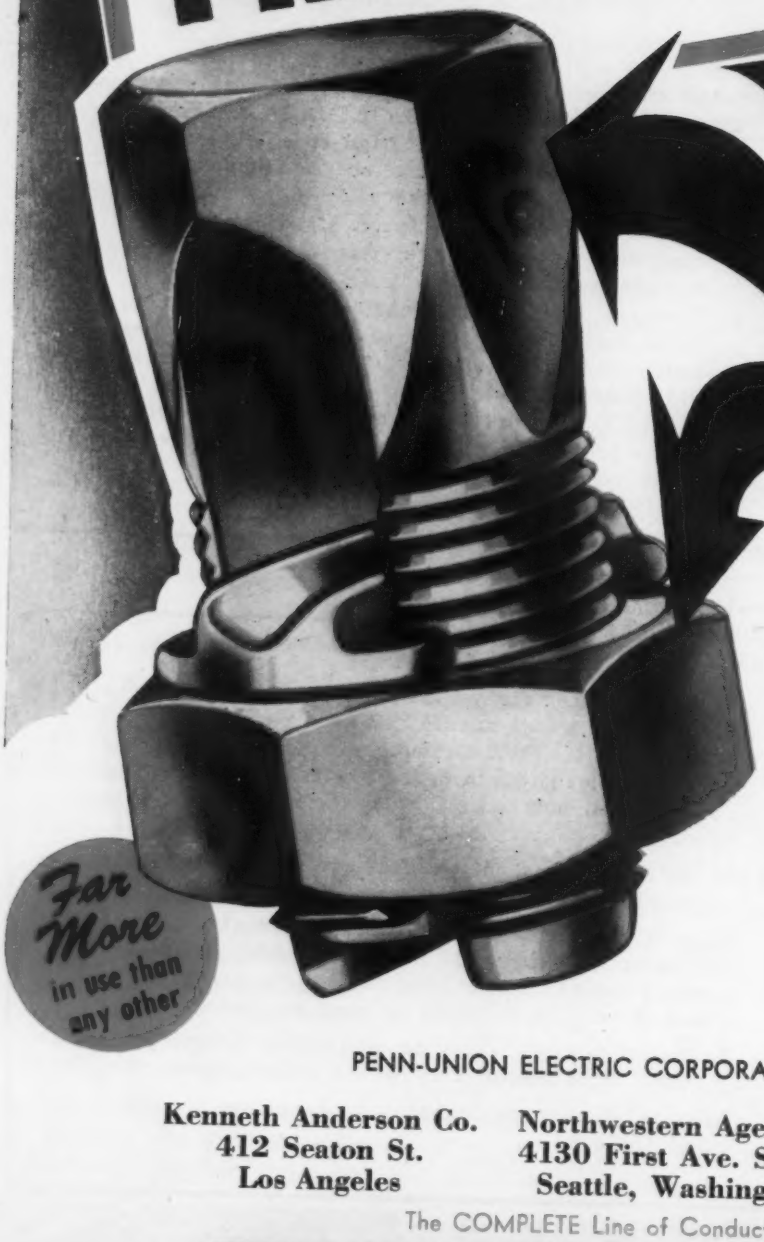
STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20, California.

RPM CALOL

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

Approved by UNDERWRITERS LABORATORIES

Here's the MOST PRACTICAL design



LARGER SURFACES

to grip with wrenches from ANY ANGLE—using either a socket or open-end wrench.

MAXIMUM CONTACT provided by V-groove; conductors protected by bevelled slot.

PRECISION MADE, with rigid inspection. Smooth, accurate threads assure maximum pressure — permanently maintained.

For taps, dead-ends, parallel connections, etc., in any location. Can be furnished in bronze or aluminum. Reusable over and over.

Far More in use than any other

PENN-UNION ELECTRIC CORPORATION, ERIE, PA.

Kenneth Anderson Co.
412 Seaton St.
Los Angeles

Northwestern Agencies
4130 First Ave. South
Seattle, Washington

F. M. Nicholas Co.
1123 Harrison St.
San Francisco

With or without retainer.

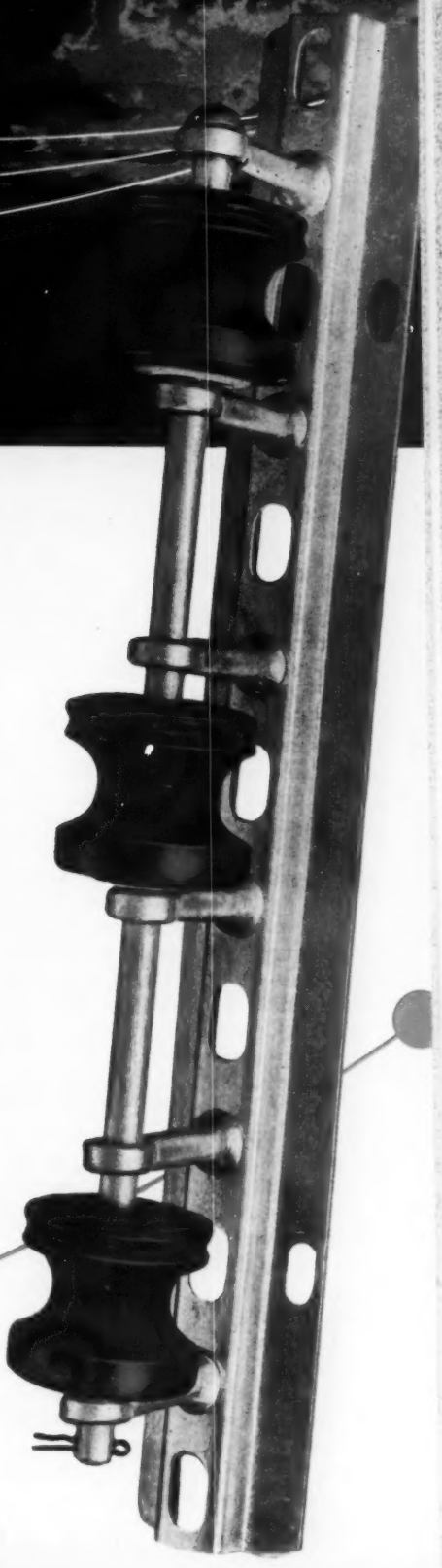
The COMPLETE Line of Conductor Fittings

PENN-UNION

HUB·RAK

– engineered to SIMPLIFY INSTALLATION and assure longer TROUBLE-FREE SERVICE

The new Hubbard HUB-RAK is designed with smoothly rounded points to avoid danger of damaged lines and provide ideal drainage. These forged steel points are rigidly attached through back to form a single rugged unit... and perfectly aligned for easy removal of insulators and to assure even distribution of strain on rack bolt. Heavy broad backs are pressed to channel shape for added strength... attached to pole at points of greatest strain—back of insulators. Each unit is protected by the famous Hubbard double dip hot galvanizing process to assure a rust-resistant rack that will outlast your lines. They can be mounted quickly, securely with lags or bolts—singly or back-to-back on the same bolts. Available in line or service types for one to four insulator installations in all standard spacings. Write today for details.



HUBBARD AND COMPANY

Pittsburgh OAKLAND, CALIFORNIA Chicago

ELECTRA'S HUSBAND

THE ENTERPRISE DEPARTMENT

YOU have to talk family finances once in awhile, even if not often. Electra and I were doing that one evening recently when she shocked me with:

"We own some stock in that utility," said Electra. "Do you think we ought to sell it and put our money into something more alert to the public?"

That was a body blow, of course, questioning the wisdom of investing in a public utility stock. "What *can* you mean?" I asked.

"I mean they don't seem to be very enterprising."

Wow! Heresy! The advocates of the enterprise system not enterprising? Why, the thought was unthinkable—almost.

Questioned further, Electra came forth with some keen observations that few of us have dared to see, even if sometimes the evidence is right under the nose. In fact, Electra had gathered *her* impressions from those I'd brought home to do a little exploding over myself—where it was all in the family. The net meat of her question ran like this.

Utility managements talk at all conventions about the system of free enterprise. Yet, when there is a stringency, they are prone to cut down or almost eliminate the *enterprise department*—that of sales and commercial development. Can they be much more than a bureaucracy if they are not commercial, seeking new business instead of merely serving that which they have?

There was a time when the sales force of the utility was the training school for the entire industry's sales force. The manufacturers and wholesalers recruited trained salespeople from the utility's pool. They knew that they'd received good basic training there.

When they went out of merchandising, Electra asked, did they go out of business? Not really that drastic, but did they lose the commercial eagerness that had driven them upward?

Another thought Electra left for me to chew over in quiet questioning moments was this: Why stop trying to develop the domestic customer? She didn't put it that way. What she recalled was that there used to be home service girls who came around, either voluntarily or on request. They brought new ideas, new gadgets, new methods and household hints. They knew how to light the living room. They could tell you why the cake fell. As Electra asked, aren't the companies interested any more? Are they taking all domestic customers for granted?

Of course, I knew that the shortage of power has something to do with it. Also a lot of other problems. But Electra doesn't know nor care much what those problems are. She thinks of the utility company as being anxious for her business—or is it?

And come to think of it, *everybody* is a domestic customer. Everybody lives somewhere. Even the big shot sometimes helps with the dishes—maids have nights out or perhaps there are no maids any more. So everybody cares about domestic electric service. It is on this service that they measure the utility.

An interesting sidelight is that no matter what status the customer has in the business world, no matter how staunch an advocate of free enterprise when it applies to his own business, if his electric service fails or becomes poor, he seeks the same redress, or is it revenge? A heavy-industry town which had almost no domestic customers, and a desert town whose populace was almost without means of support—both used the same tactics to get better electric service. Both went to government.

Maybe Electra hit onto a public sentiment that is making it hard to get money for necessary expansion. The investor likes to put his money into an eager, aggressive, commercial enterprise. Talking about it doesn't prove it. Action—it speaks louder than words.

ELECTRA'S niece brought home an economics book the other day that was required reading in a course she was taking. I looked through it after dinner while the two of them were washing the dishes. What a shock! It was authored by one of the bright New Deal economists whose sole experience had been in a semi-managed economy. The niece's businessman father certainly would have been happy his daughter was being taught that he was a social parasite and a back number.

It occurred to me that our business economy is going to be in for a lot of trouble during the next few years if the youth of the country are filled with this kind of twaddle. In the mind of this author there is no such thing as free private enterprise. Modern economics, to his way of thinking, is really a formula for dictatorial political control over the economic life of every citizen from the lowest to the highest. It is based upon an appeal to the common man, who is told that "common sense" gives the answer to all economic problems.

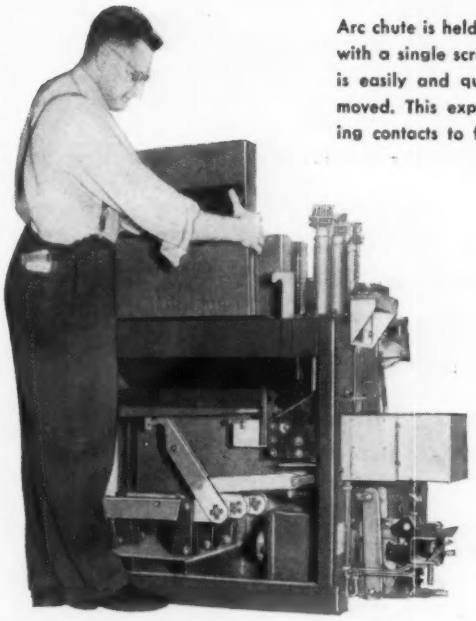
The index was a revelation. No listing of profits as a reasonable and rational share of the social income. No mention of enterprise as a part of the productive machinery. An entrepreneur was a social outcast.

Basic economic reasoning propounded is that the productive machine can, through government policy and declaration, be made to create *full employment* rather than useful and valuable *products*. Money, it contends, is a unit of account, to be managed by the government. A managed currency can be inflated at will as the politicians dictate, to keep up with rising costs of living. The book says nothing, however, about the inevitable consequences of such perversion. It holds out to the student an economy in which self-achievement and individual progress are traded for old-age pensions.

When Electra and I talked about this kind of teaching later that night we both agreed that college curricula need overhauling.

ALLIS-CHALMERS METAL-CLAD SWITCHGEAR

Easy to Inspect and Maintain!



Arc chute is held in place with a single screw which is easily and quickly removed. This exposes arcing contacts to full view.

CHECK *RUPTAIR* BREAKER CONTACTS WITHOUT REMOVING HEAVY MAGNETIC CIRCUIT MATERIAL

EASY INSPECTION and maintenance was named a top feature of A-C switchgear in a recent survey among operating engineers. They based their choice on the sound design of A-C's removable element: both movable and stationary contacts on *Ruptair* magnetic air circuit breakers can be inspected and maintained *without* removing the heavy material of the magnetic circuit. Simply remove *one* screw. Real savings in maintenance time and trouble!

These and other preferred features add up to the kind of reliable and dependable switchgear that engineers and operating men alike demand. For more information, write to ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2501

HERE ARE 5 OTHER PREFERRED FEATURES:

RUGGED CONSTRUCTION . . . rigid, self-supporting structure of steel angles and formed plates is lap-welded. Only two full length channels required for simple four point support. Result: only four point alignment necessary.

A-C DESIGNED arcing contacts of high melting point alloys minimize burning, assure low maintenance, long life under repetitive duty.

CONTACT FINGERS on removable element permits easy inspection and maintenance without de-energizing the main bus.

PREDICTABLE low installation costs . . . unit is "packaged" ready for connection. Detailed drawings provided for each installation.

ADEQUATE BUS INSULATION . . . no-corona tape, bakelized paper tubing, insulating tape eliminates compound-filled joints. Easily installed in field and removed for installation changes.

ALLIS-CHALMERS builds these circuit breakers: Air Blast, *Ruptair* magnetic air, *Ruptor* oil units, Low Voltage.

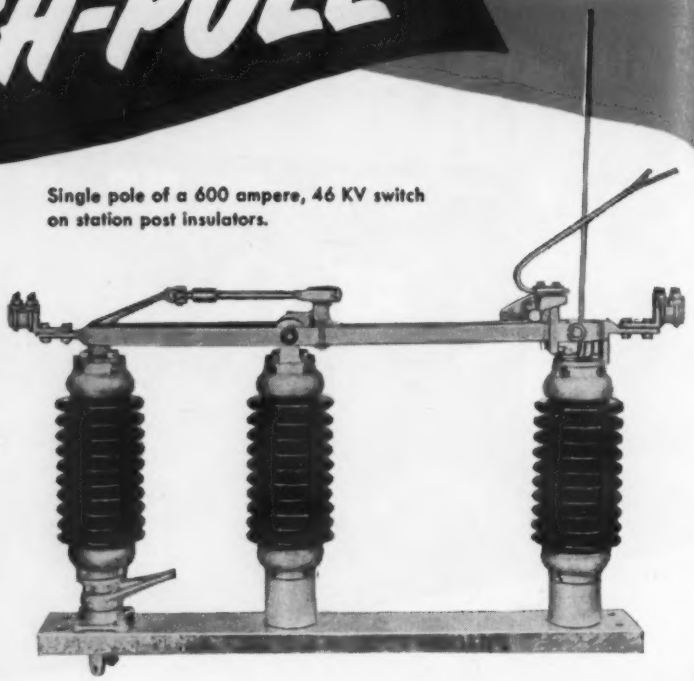
Ruptair and *Ruptor* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

First in the U. S. with Metal-Clad Switchgear

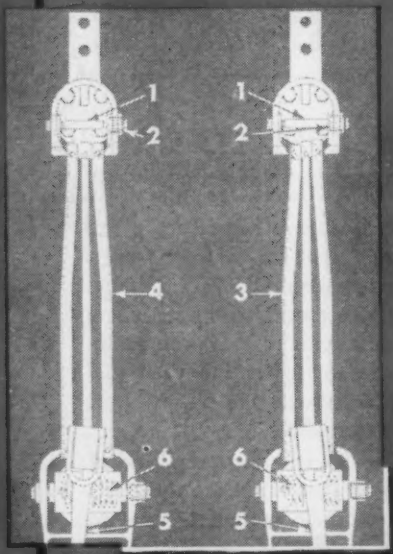
JUST PUSH-PULL

Single pole of a 600 ampere, 46 KV switch on station post insulators.



The operation of the Three E 8400 type switch is as simple as that. In the closing cycle, rotation of the rear insulator stacks are transmitted through a powerful toggle mechanism to two blade members. One blade is pushed forward and the other pulled backward, expanding the blade assembly, wiping the contacts and setting up high pressure. In the opening cycle, the same thing happens in reverse.

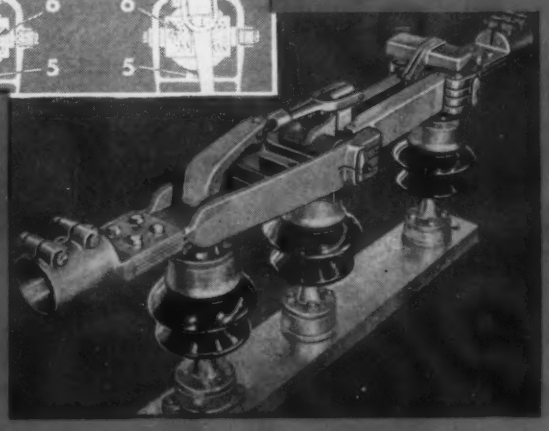
This design of switch insures clean contacts at all times. The high pressure contacts at both ends of the switch eliminates all shunts. Since pressure is removed before the switch blade starts its outward travel, the switch will always operate with ease.



1. Limit sleeve to assure proper contacting.
2. Pre-load contact spring working in conjunction with limit sleeve.
3. Blades collapsed. Pressure released.
4. Blades expanded. Pressure applied.
5. Toggle mechanism to hinge insulator supplying power to blade members and assuring full mechanical control of blade in all positions.
6. Blade counterbalancing spring.

8400 type switches are made in ampere ratings up to 5000 and in voltage ratings up to 230 KV.

Single pole of a 2000 ampere, 15 KV switch on NEMA standard insulators. The absence of shunts on a switch of this ampere rating makes an easier operating switch as well as giving a better appearance.



Ask for Bulletin 327

THREE E — ELECTRICAL ENGINEERS EQUIPMENT CO

MELROSE PARK, ILLINOIS

OCTOBER 1948 Vol. 101, No. 4

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

NEW MARKETS — NEW INDUSTRIES

IN an ever-increasing degree the future welfare of the electrical industry of this region is becoming dependent upon industrial development. Time was when industrial loads of the electric light and power companies and the electrical markets of the manufacturers here in the Far West were limited to resource-based industries. Lumber, mining, fisheries, the processing of agricultural products—these were the principal industrial customers of the twenties and thirties. Electrical loads and markets were largely domestic and commercial.

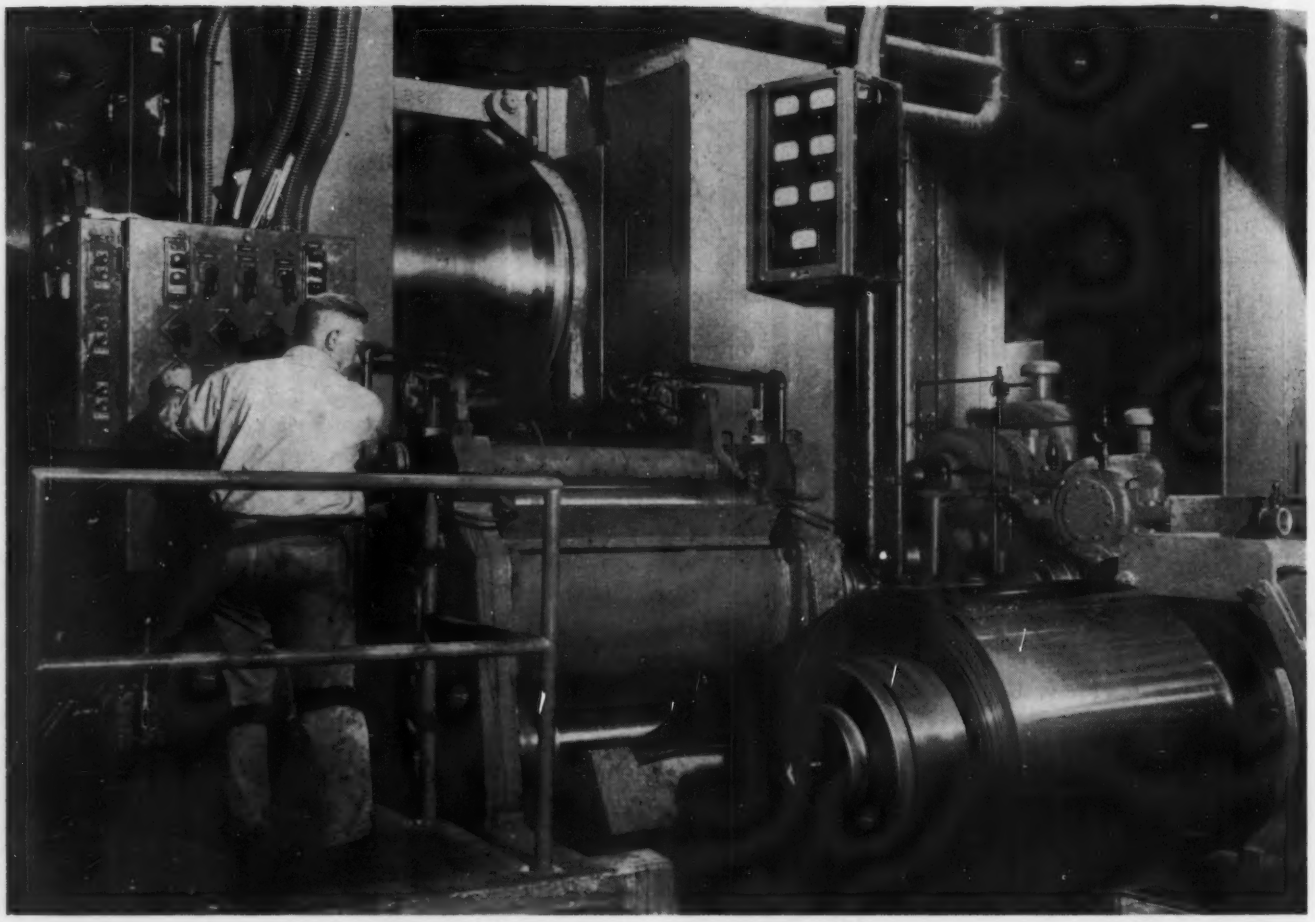
The war and its population influx changed all that. People and income make markets. The West suddenly found itself with a greater share of both than even its most optimistic advocates ever dreamed about. Now the Western trend is toward population-based industries. And so long as the new industries of the region can compete in price and quality with industries located elsewhere, this expansion will continue. The Western market *per se* has become so attractive and so large that local industrial facilities are feasible and economical. Hence the Westward trend of industry.

There is another primary reason for this change. An integrated and self-sufficient industrial economy must have a metallic base. Up until World War II the West lacked such a base. Its metal requirements were largely imported. Iron and steel production fell far short of the market demand. A single aluminum reduction plant produced pig that was sent elsewhere for processing. Even though the region produced a major proportion of the nation's raw copper, it neither refined nor processed this metal until just recently.

Wartime industrial developments when this area became one of the primary sources for war material changed the metal picture. Steel production was increased then. Light metal producing facilities quadrupled. At war's end this expansion did not cease. All of the steel companies serving the West embarked upon development programs. United States Steel and its Western subsidiary, Columbia Steel, together with Bethlehem Steel, Colorado Fuel and Iron, Kaiser Steel and Pacific States Steel, all appropriated substantial sums to enlarge the steel producing facilities of the area. Completion of these projects will raise the steel-producing capacity of the Far West to 3,000,000 net tons of finished steel annually or more than treble the prewar capacity. Ingot capacity has almost quadrupled. Finished steel products not hitherto available may now be obtained for local manufacturing plants.

In light metals, Alcoa, Reynolds and Kaiser are all working on projects that will provide a variety of materials for processing in Western industrial plants.

What some of these developments mean in terms of electrical load and electrical problems is detailed in the pages that follow.



Temper rolling mill. Sheet steel coils weighing up to 15 tons that have first been cold reduced and processed are run through one of two such tin temper mills before passing through either hot-dip or electrolytic tin lines

Columbia's New Sheet, Tin Mill

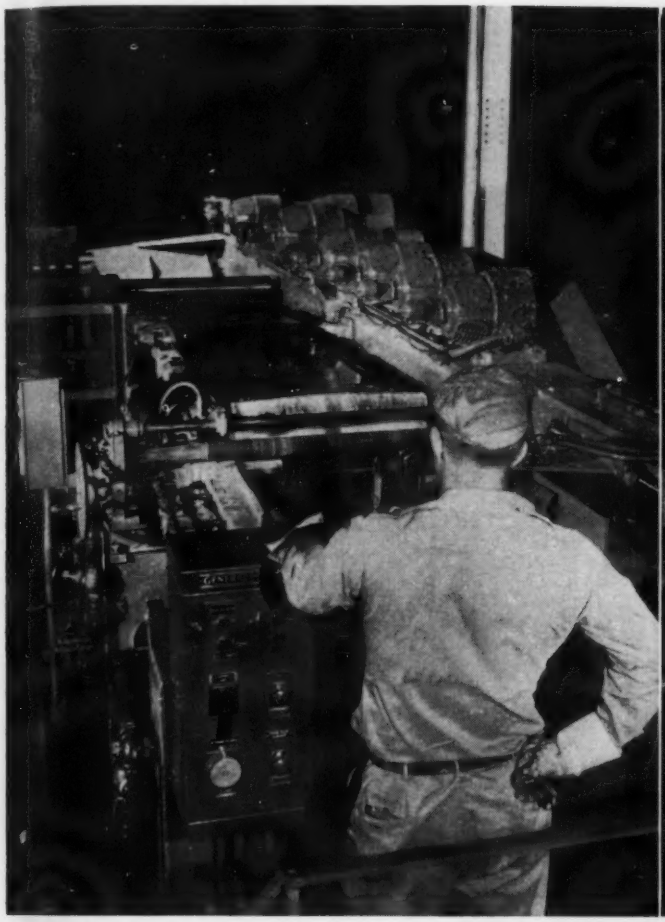
STEEL production in the West entered a new and significant phase with completion of Columbia's cold-reduction mill at Pittsburg, Calif. This $25,000,000 plant, located in the San Francisco Bay region, was built by Columbia Steel Co., a U. S. Steel subsidiary, as part of an expansion program to its already vast plant at Pittsburg. It is turning out both hot-dipped and electrolytic tin plate as well as other cold-reduced products with annual capacity of 400,000 net tons. Addition of tin plate and sheets to the long list of steel products already being manufactured on the Pacific Coast constitutes a major step in the industrial progress of the West.

Columbia already had a high-speed continuous-rod and wire mill at Pittsburg completed in 1943, producing 225,000 net tons of product a year. In addition to products of the new sheet and tin-plate mill and the continuous-rod mill, a number of other steel products are made by Columbia at Pittsburg. These include railroad plates, nails, merchant bars, wire and wire rope. Steel has been supplied partly by seven open-hearth furnaces at Pittsburg and by pig iron from the Geneva Steel Co. at Provo, Utah, also a U. S. Steel subsidiary. Facilities will soon be completed at Geneva to supply the hot-rolled steel for Columbia's new cold-reduction mill at Pittsburg.

Electrical Facilities

The new cold-reduction mill at Pittsburg has a load of 30,000 kva. Service is supplied by Pacific Gas and Electric Co. through an automatic substation over two 110-kv. lines from different sources. Special relaying and switching facilities and automatic operation provide a high degree of continuity of service. From an outdoor substation power is fed to the new mill at 6.9 kv. All large m-g sets are served at this voltage, so-called steel mill standard. The electrical engineer's problem in laying out a mill of this type is not alone one of selection of motors and control, but of providing conversion and distribution facilities for six different kinds of power.

First there is the 6,900 volts mentioned, with all its switchgear. Then there is a large amount of d-c at 600 volts required. All main mill drives are 600 volts, d-c. This is supplied by large motor-generator sets driven by 6,900-volt motors. There is a large demand, too, for power at 250-volts, d-c. This is for shop power, small motors, auxiliaries, cranes and the



Tin plate shearing line, one of three which prepares plate for hot-dip tinning process at new Columbia Steel plant

Continuous pickling line where hot-rolled sheet is thoroughly cleaned before passing to the cold-reduction mill

electrolytic tinning lines. A-c power at 2,300 volts is used for general-purpose power, for air compressors, small m-g sets and for a 2,300-volt primary system to serve lighting transformers. Four forty volts, a-c, is extensively used for small constant-speed drives. Finally, there is the lighting system that operates at 120/208 volts, four wire, a-c. To distribute 30,000 kva. in nine immense buildings of the mill having a floor area of 24½ acres, and in all these categories, is a sizable problem in distribution engineering.

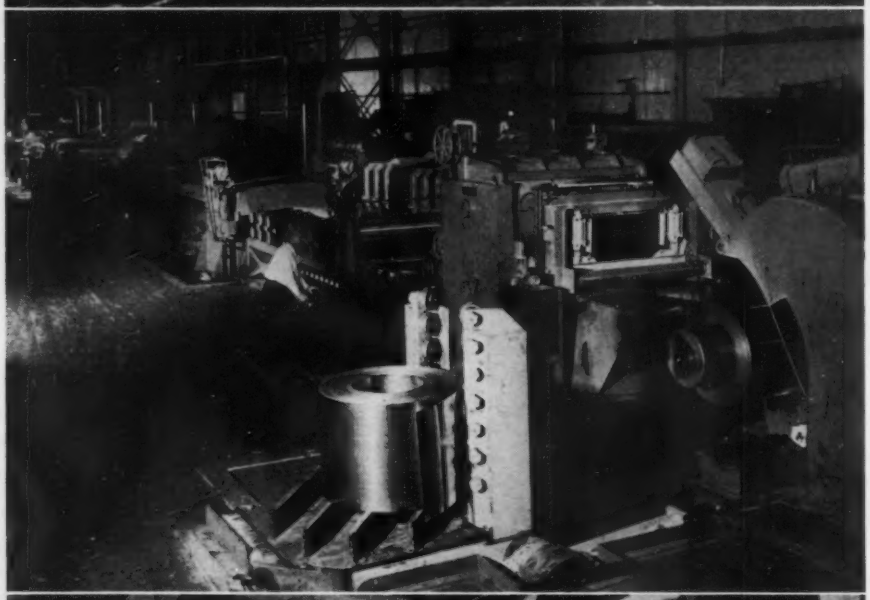
In addition, there is great complexity in applying power to the numerous types of motor drives, controls, electrolytic processes and other uses made of electrical energy. Motor controls are most intricate. They range from the most simple to those using Amplidyne, Regulex, Ward-Leonard, and even electronic controls. Instrumentation, protective systems, interlocks and safety devices—all are a maze of detail and intricacy. They are marvels of the electrical engineer's ingenuity. One electronic device will detect pinholes as small as 0.0015 in. in fast-moving flat steel. Other electronic devices control slack in uncoiling lengths of steel hundreds of feet long, sort and count sheets of steel and perform many other critical operations and functions.

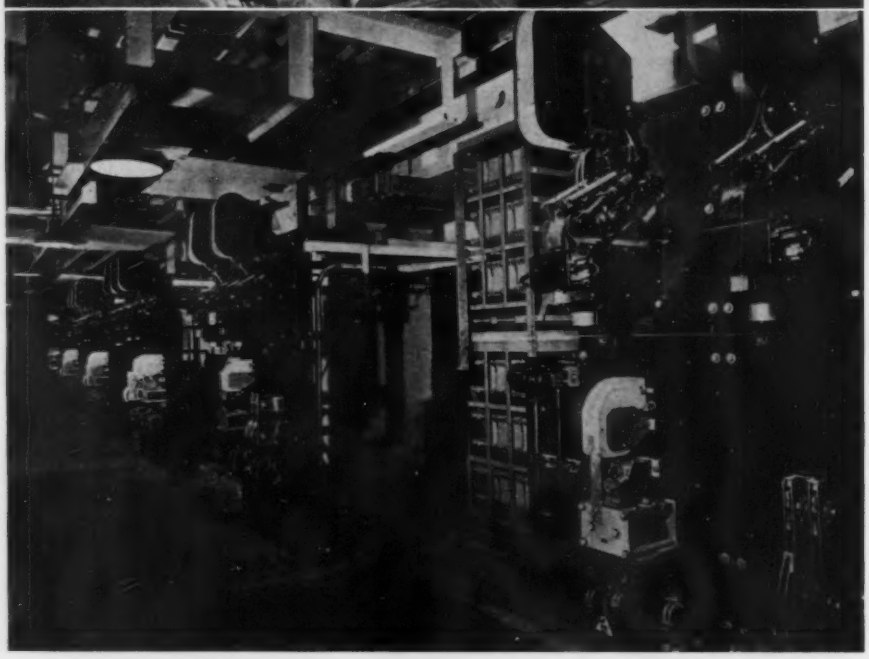
Material Flow

Hot-rolled sheet coils received at the plant are accommodated in a large storage bay, from which material is drawn as required to meet rolling schedules. Coils intended for processing into sheets and tin plate on the cold-reduction mill are first run through a continuous pickling unit, where they are thoroughly cleaned. After recoiling, the steel is taken to the cold-reduction mill where it is rolled under pressure of a million pounds per square inch to the desired thickness and coiled as it leaves the mill for transfer to an electrolytic cleaning line. After cleaning and annealing, relatively heavy-gage material for sheets is run through the sheet temper mill.

Strip to be processed into tin plate, after cleaning in the electrolytic cleaning line, is loaded in tin coil annealing furnaces and, after annealing, run through the tin temper mills. After temper rolling, the flow of material is split, according to whether the strip is to be tinned electrolytically or by the hot-dip process. Hot-dip tin plate is produced by cutting the cold-reduced annealed strip into plates of the proper sizes, followed by pickling, tinning, and inspection and sorting of the plate as it passes out of the tinning line. The new plant has a total of fourteen hot-dip tinning units complete with auxiliary equipment that makes each line an independently operating unit.

The continuous electrolytic tinning line is 250 ft. in length. Strip first passes in vertical loops through successive cleaning solutions, through a brushing station and then into the plating tanks. After brushing, spraying and drying it passes to a vertical muffle furnace where the strip is heated until the tin coating flows. After this it passes through a chemical treating station and is sprayed and dried before passing through an emulsion oiling machine. The tinned strip then passes through an electronically controlled looping station, followed by a rotary shear which cuts the strip into ordered sizes. The tin plate then





passes to an automatic classifying machine to be sorted into grades. Prime plate goes onto a conveyor with a weighing and wiring station where the bundles are securely tied for shipment.

Main Drives

The five-stand tandem four-high cold-reduction mill, designed to operate at a nominal finishing speed of 3,900 ft. per minute, consists of five identical stands. Drive motors operate on 600 volts d-c. The first stand is driven by a 1,500-hp. motor; the second by a 3,000-hp. motor; stands three and four each are driven by a 3,500-hp. motor, while a 4,000-hp. motor drives the fifth stand. Direct-current for these drives is provided by two motor-generator sets, one of which is driven by a 6,600-hp. motor and the other by a 13,300-hp. motor. Both operate on 6,900 volts a-c. Amplidyne-controlled field excitation is used on main-drive motors for refinement in speed control. All electrical equipment for the five-stand cold-reduction mill was furnished by the General Electric Co.

Tin temper mills, of which there are two, consist of two-stand tandem four-high mills. Each stand is driven by one 500-hp. and one 800-hp., 600-volt d-c motor. Between the two stands of these mills automatic tension control is maintained by a tensiometer. This is a regulating device operating with oil pressure to actuate an electrical regulator. The regulator in turn, through Regulex control of motor field, automatically maintains constant tension on the steel being rolled. These are the first temper mills operating at high speed of 3,300 ft. per minute to be equipped with automatic tension control between the main stands. Electrical drives and equipment for these temper mills was furnished by Allis-Chalmers Mfg. Co.

Five-stand cold-reduction mill driven by motors totaling 15,500 hp. rolls steel plate at rate of 45 miles per hour. Each stand is individually and automatically controlled from panels shown

Electrolytic cleaning line where lubricant from the cold-rolling operation is removed. Direct-current combined with alkali solution does the cleaning. New mill has two of these lines

Control basement beneath cold-reduction mill showing main breakers and related electrical equipment. Five-stand mill requires 15,000 hp. supplied from two motor-generator sets

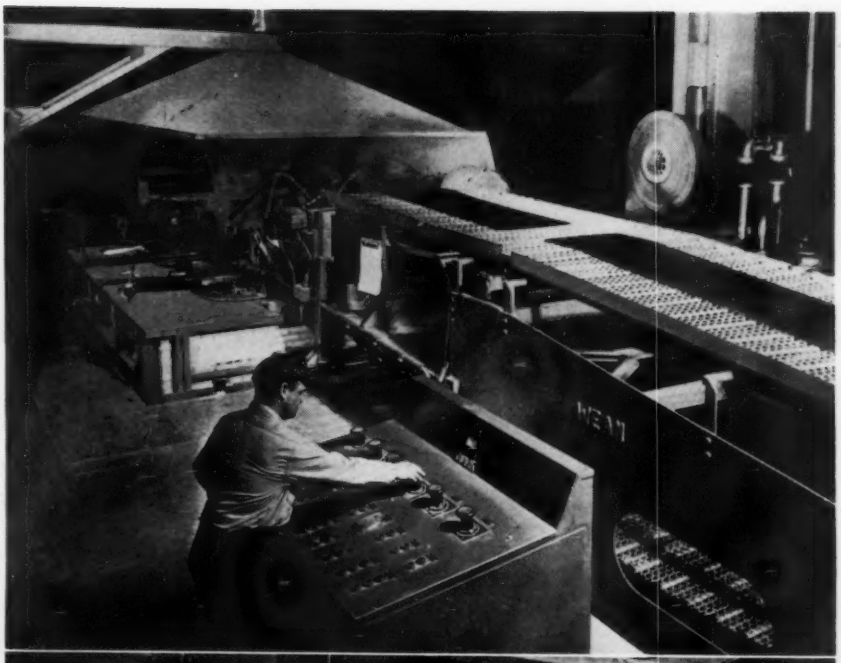
Cold-reduced, annealed and tempered grades are produced by cold-reducing hot-rolled steel on the five-stand cold-reduction mill mentioned. After this the coils are annealed and electrolytically cleaned prior to rolling to the desired temper and finish in a single-stand four-high sheet temper mill, either in sheet or strip form. This mill is driven by a 1,000-hp., 600-volt d-c motor, supplied by the General Electric Co.

Other major electrical equipment consists of the two 1,500-kw. Ignitron rectifier sets mentioned, furnished by the Westinghouse Electric Corp. These supply 250 volts d-c for general needs such as cranes, various mill and processing lines, etc. There are many smaller motor-generator sets, important drives and controls and switchgear too numerous to describe. Large basement areas beneath processing lines are a maze of electrical equipment.

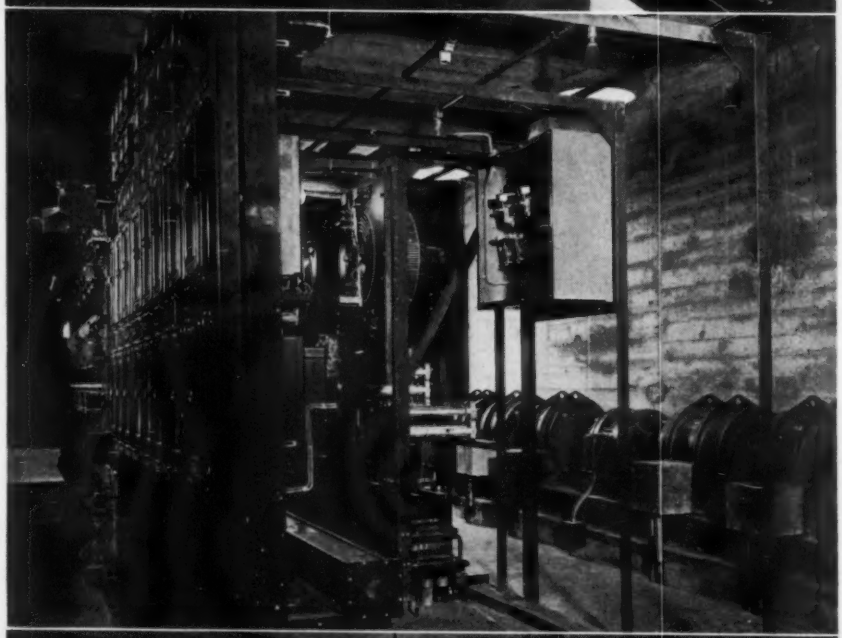
Lighting Service

High-bay luminaires with 1,000-watt incandescent lamps are spaced to provide required intensity for the operations performed. This general lighting is then supplemented with local lighting as required. Lighting panelboards are fed by 75-kva., 3-phase, 2,300/120/208-volt transformers, some of which are of the dry type. These are located in pairs on platforms attached to roof girders of the buildings. As previously mentioned, there is a separate 2,300-volt primary system throughout the plant to feed these lighting transformers.

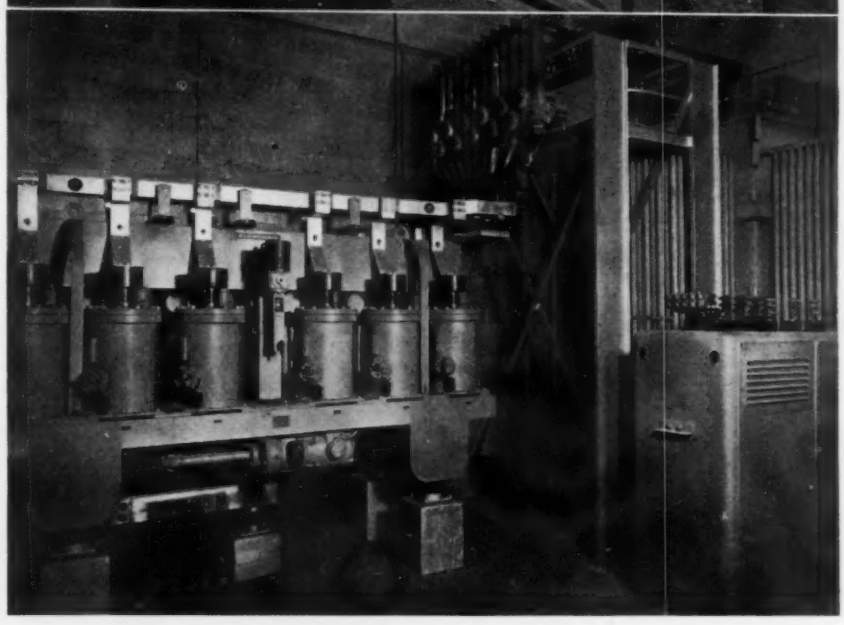
The accompanying photographs will help round out the story of Columbia's new cold reduction mill. It is an immense plant that will employ 3,900. Machinery for the new mill comprised 675 carloads of equipment weighing 27,000,000 lb. Facilities are the most modern to be found anywhere in the country.



Control station for one of the galvanizing lines where sheets are fed through bath of molten zinc. Galvanized sheet steel is one of several products made in new Columbia mill



Control basement for two-stand tin temper mill showing six-unit Regulex set for speed control on 500-hp. and 800-hp. drive motors. Modern steel mill controls are very highly intricate



One of two 1,500-kw. Ignitron rectifiers that supply 250 volts d-c for general-purpose power in new mill. Power in five other categories is required in Columbia Steel's new mill

Steel Expands

WITH COMPLETION of several major steps in a $16,000,000 expansion program, Bethlehem Pacific Coast Steel Corp. now can produce approximately 650,000 net tons of ingot annually in its three West Coast plants. Recently completed facilities include a new bolt and nut plant at Seattle; a spectrographic testing laboratory, additions to the transmission tower fabrication plant and new bolt and nut producing machinery at South San Francisco; and a 50-ton, 15,000-kva. electric furnace, high-speed combination bar and rod mill, wire drawing mill and a 32-in. blooming mill at the Los Angeles plant.

Each of the plants is an integrated operation utilizing largely scrap for steel making. Seattle has five 50-ton open-hearth furnaces; South San Francisco five 60-ton furnaces and Los Angeles, three 50-ton furnaces. Last year, steel shipments from the three plants were: Seattle, 177,507 tons; South San Francisco, 181,570 tons; Los Angeles, 95,501 tons. Principal products were: merchant bars, structural shapes, bolts and nuts, reinforcing bars, hot-rolled strip, narrow-width U-M plates, railroad tie plates and spring steel. During 1948, there was added to this list, rods, bars and wire by the new facilities mentioned.

Total finished steel market requirements in 1947 in seven Western states were 3,500,000 tons annually, according to H. H. Fuller, president of Bethlehem Pacific. Against this, the West had capacity for producing 2,750,000 tons of finished steel annually. The deficiency of 750,000 tons was supplied by Eastern mills. Figures for 1948 are, of course, not yet available. Steel production has increased some, but so has the market and the West can be short as much or even greater tonnage. However, the West is coming rapidly into its own in steel production and processing, with all major producers having continuous expansion programs. Steel is forging ahead.

Top: New 32-in blooming mill has capacity of 80 tons of billets per hour; is driven by 3,000-hp. 600-volt d-c motor. Center: High-speed rod and bar mill at Bethlehem's Los Angeles plant. Lower: Battery of wire drawing benches in the new Los Angeles mill

Run-out table extending from five-stand aluminum reduction mill at Kaiser's Trentwood rolling mill at Spokane. Output was 227,800,000 lb. for the year ending May 31, 1948.

This is the only aluminum rolling mill in the West; covers 53 acres under one continuous roof. Permanente Metals Corp. is operator. Power requirements will be 35,000 kw.

Northwest Aluminum is Big Business

WITH THE WAR-BORN aluminum industry of the Northwest completely revived and producing at full capacity of 530,000,000 lb. annually, and with Western steel production reaching nearly three million tons yearly—the West now has a substantial metallic base to its economy. Aluminum would expand still further if power were available. The aluminum industry of the Northwest is now using 605,000 kw. of prime federal power. Of this, 570,000 kw. is used in the production of pig. The other 35,000 kw. is in the Trentwood rolling mill. It is authoritatively stated that national production of aluminum in 1948 will be 550,000,000 lb. short of demands. By 1951, the shortage will have reached 750,000,000 lb. To produce these deficiencies would require roughly 550,000 kw. and 750,000 kw. of firm power, respectively (one kw. operating continuously will produce about 1,000 lb. of aluminum per year.)

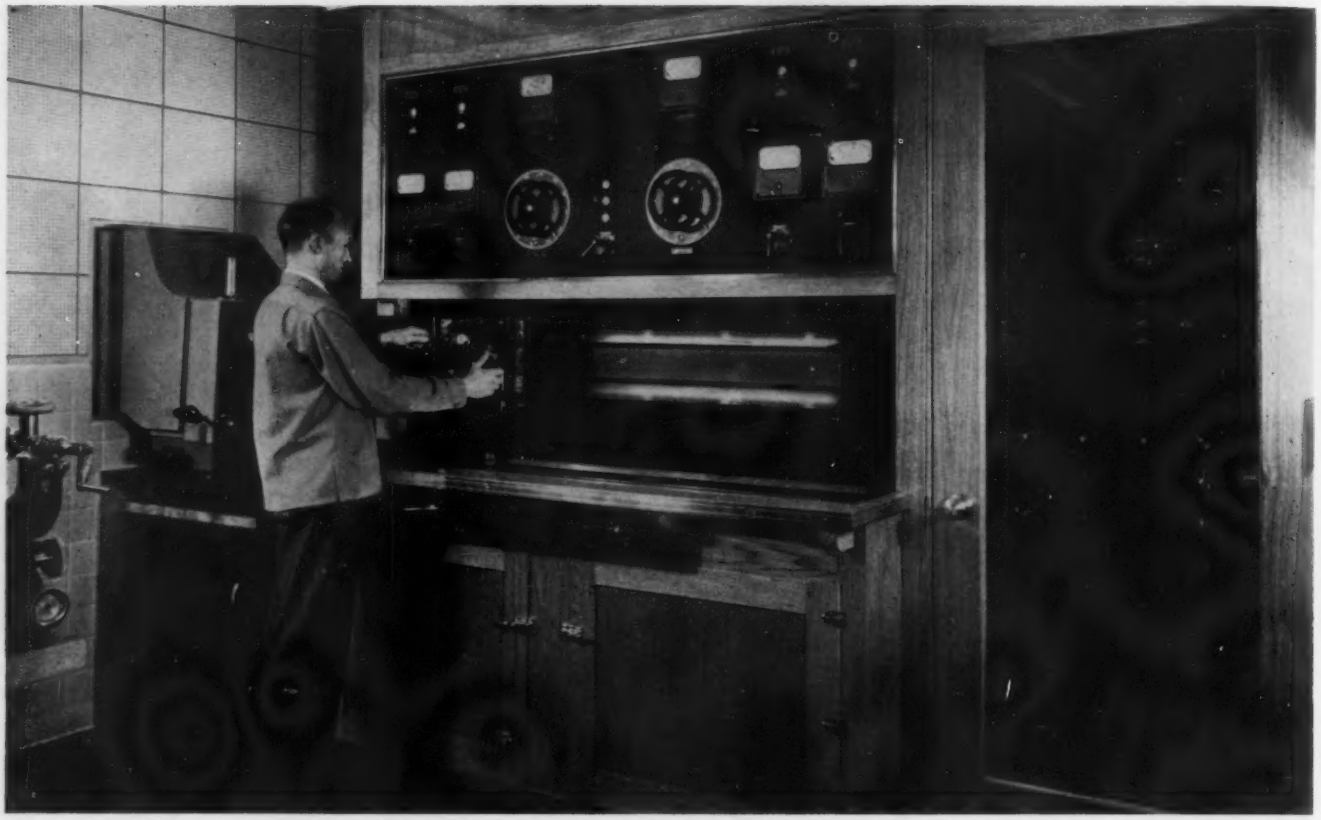
No such capacities are available anywhere in the country, nor any small part of them, at least at the federal rate of two mills. The aluminum industry would like to have more Northwest power but has been told that present firm power commitments will have to stand until 1956 when some surplus power may be available from developments under way or contemplated. Already, aluminum is using 44% of the kwh. output of the Grand Coulee and Bonneville plants.

However, even with production frozen at 530,000,000 lb. or thereabouts, the Northwest is producing 46% of the nation's output. With exception of the requirements of the Trentwood rolling mill at Spokane and some small local usage, all pig produced is shipped out of the region. There are some aluminum fabricating plants now, but the Northwest wants to see more manufacturing to turn out additional finished products in the region. This is a Northwest problem.

Power Contracts With Northwest Aluminum Industry

Company	Plant Location	Kilowatts of Contract Demand Long Term	Kilowatts of Contract Demand Temporary	Year of Expiration	Year Plant Built	Year of Power Commitment
Aluminum Co. of America	Vancouver, Wash.	130,000	42,200	1959–1960	1940	1939
Reynolds Metals Co.	Longview, Wash.	60,000	6,200	1961	1941	1941
	*Troutdale, Ore.	141,680	.....	1956	1942	1946
Permanente Metals Corp.	*Tacoma, Wash.	44,000	.....	1967	1942	1946
	*Spokane, Wash.	194,000	32,800	1963	1942	1946
	*Trentwood, Wash.	35,000	.....	1967	1942	1946
Total		604,680	**81,200			

* Plants built by the Reconstruction Finance Corp.
** Short-term contracts for power totaling 81,000 kw. expired Aug. 15, 1948.
Note: Plants operate at 98% load factor. Nine kwh. is used per pound of aluminum produced.



Spectrographic laboratory of Bethlehem Pacific Coast Steel Corp., where samples of each steel melt are quickly analyzed to detect "tramp" elements that would impair quality of steel produced. It is the first on the Pacific Coast

Spectrograph for Quality Steel Control

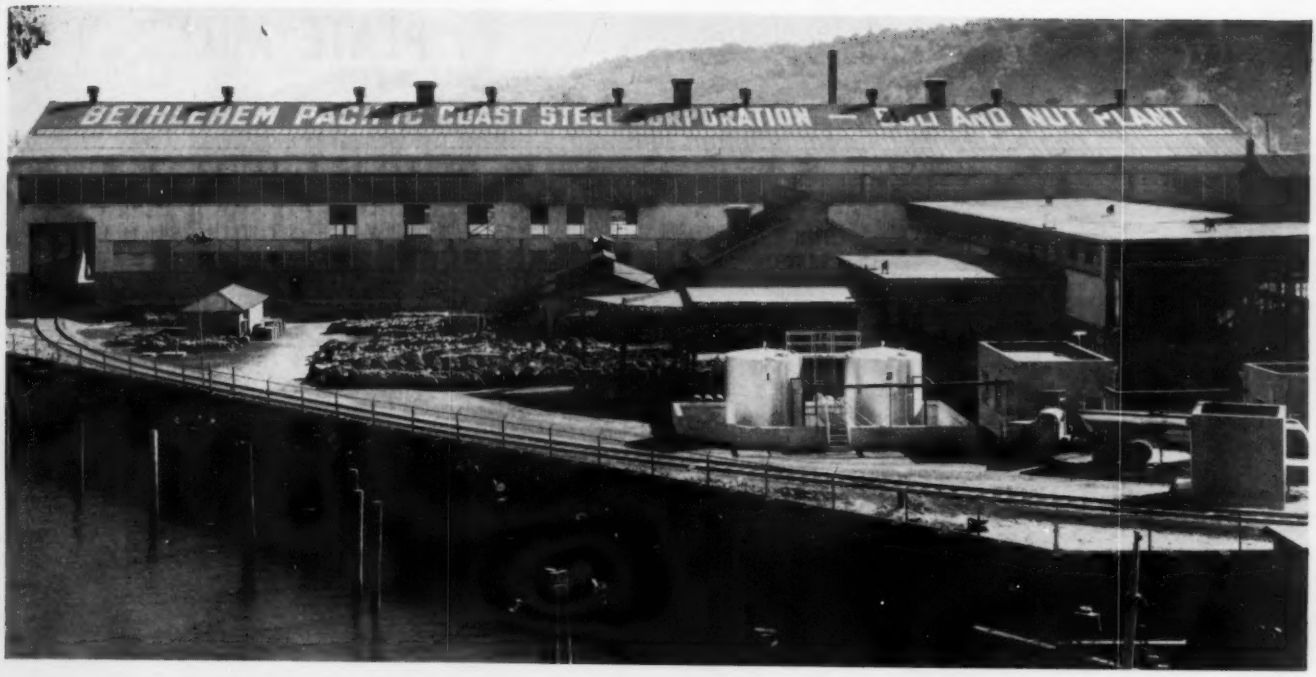
SPECTROGRAPHIC analysis of product is the steelmaker's latest production tool for analyzing steel to determine the kind and exact quantity of each of a large number of elements present. The last word in an instrument of this kind has recently been installed at the South San Francisco plant of the Bethlehem Pacific Coast Steel Corp. It is the only spectrographic laboratory in the West built for steel production quality control where every heat of steel is analyzed.

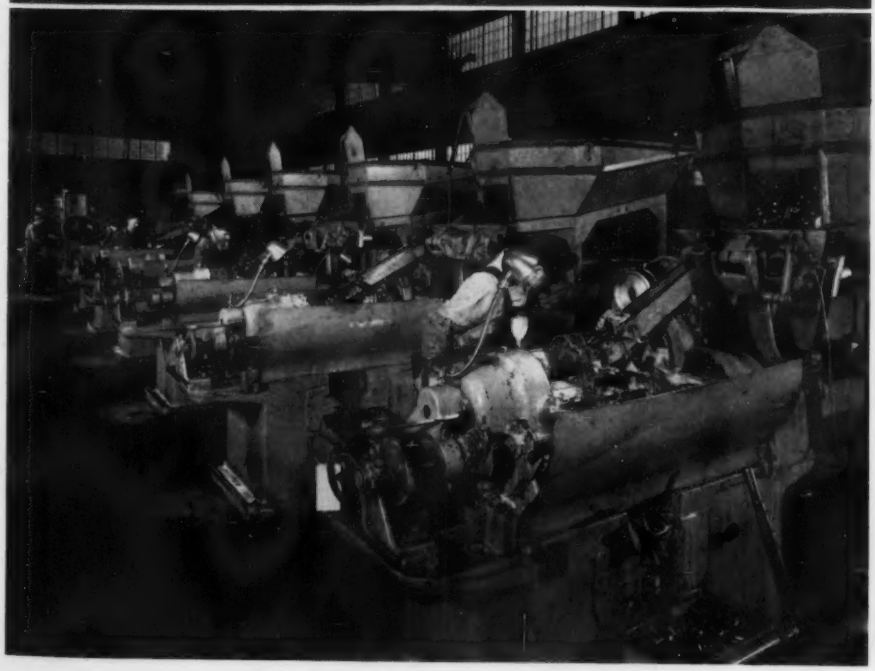
The spectrograph operates on the well-known principle that the light emitted by a molten mass can be broken up by a prism into the characteristic spectral lines of the various elements contained in the mass. By means of a microphotometer (shown) the elements are identified as to kind and the exact percentage in which they are present can be determined.

Where steel is produced partly from scrap containing various undesirable elements such as copper, tin, nickel, molybdenum, chromium, arsenic, antimony and tungsten, it is necessary to sample and analyze each steel melt if quality is to be controlled. Until the introduction of the spectrograph, it was impractical to determine all the residual elements in steel due to the length of time involved and the large force of chemists that would be necessary.

Microphotometer that measures spectral lines of steel samples to determine exact percentage of constituents. Without modern instruments a large crew of chemists would be required.

The most obvious advantages of spectrographic methods are their extreme sensitivity and the speed with which results may be obtained. All elements that react favorably to spectrographic methods are determined simultaneously on one photographic plate. When done by conventional chemical methods each element must be run individually. Once the necessary calibrations have been made, many spectrograph analyses can be made in 30 minutes or less. The spectrograph is of the Littrow type having a high dispersion essential on account of the large number of lines in the iron spectrum.





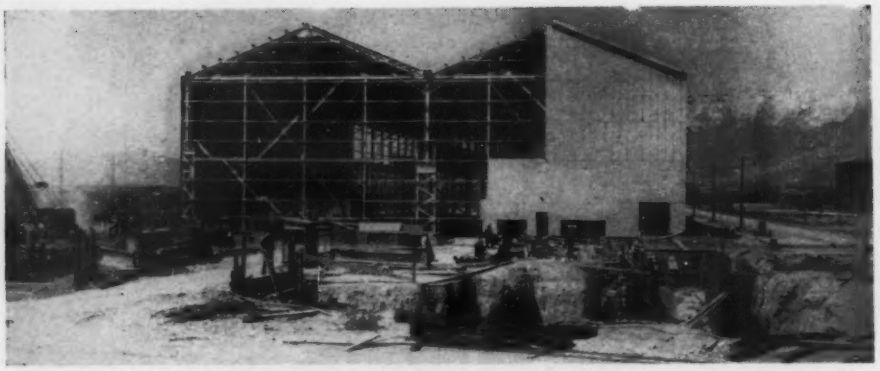
More Nuts and Bolts

WITH recent completion of Bethlehem Pacific's new bolt and nut plant in Seattle, West Coast production of these and related items has now reached 30,000 tons annually in the company's three Pacific Coast plants. The new plant contains the latest types of machines for production of bolts, nuts, rivets, track spikes and a wide range of bar and rod specialties. The operation is completely integrated from blast furnaces to packaging of products. All machinery has been painted in the "dynamic color scheme" to promote safe and efficient working conditions.

New Seattle bolt and nut plant of Bethlehem Pacific Coast Steel Corp. Costing $500,000, it is step in a program of rebuilding Pacific Coast Forge plant acquired by Bethlehem in 1945

Battery of bolt and nut machines turning out 10,000 tons of steel product

Line of automatic bolt threading machines, three-dimensional color scheme is used on machines throughout plant



Storage building for hot-rolled coils soon to be produced in Geneva plant

PLATE MILL CONVERSION at GENEVA

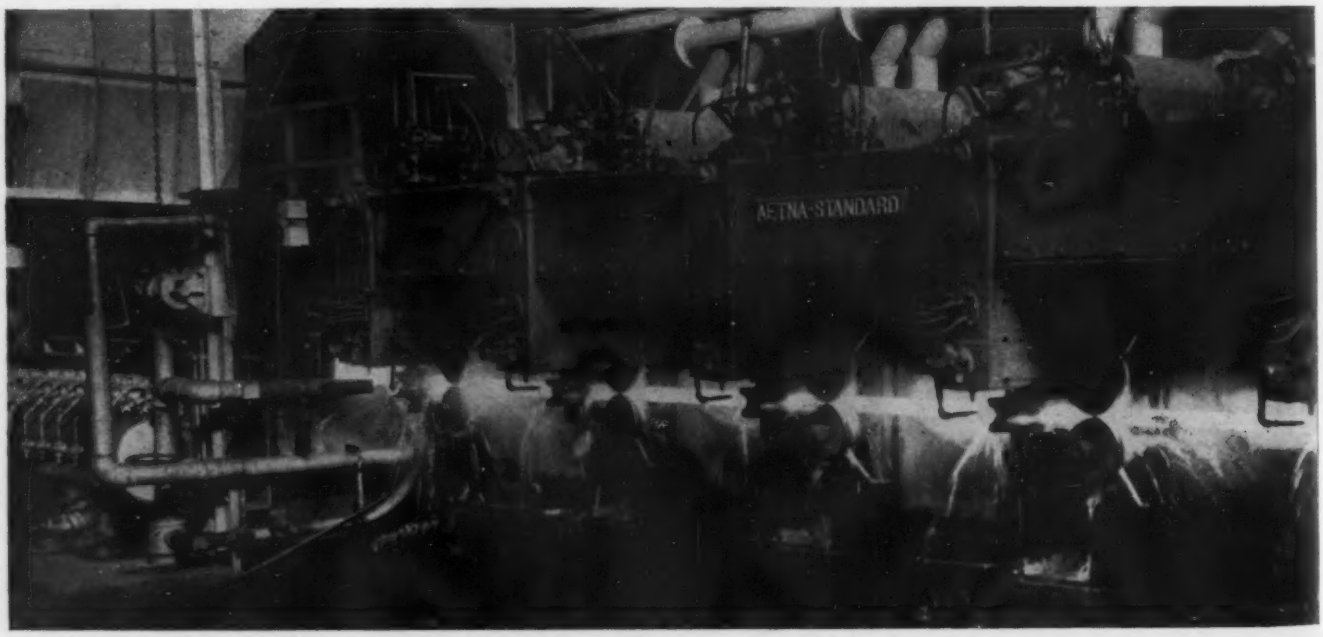
WHEN THE CONVERSION of Geneva's plate mill is completed early in 1949, Geneva Steel Co. at Provo, Utah, will be equipped with facilities for producing the coils of hot-rolled strip steel required by the new cold-reduction mill of the Columbia Steel Co., at Pittsburg, Calif. Here, Columbia processes the hot-rolled strip into cold-rolled sheets and tin plate. Geneva's new facilities will also supply another such cold-reduction mill projected by Columbia at Torrance, Calif. Both Geneva and Columbia are subsidiaries of the U. S. Steel Corp.

Geneva's project is the major part of a conversion program which U. S. Steel agreed to undertake at the time of the plant's purchase from the government June 19, 1946, at an expenditure of not less than $18,600,000. As a war industry, the Geneva plant concentrated on production of steel plates and structural shapes for Pacific Coast shipyards, but is now directing its efforts to the production of steel commodities more commonly used in a peacetime economy. The conversion program referred to will equip Geneva with facilities for manufacture of the new product in addition to plate and structural shapes presently produced.

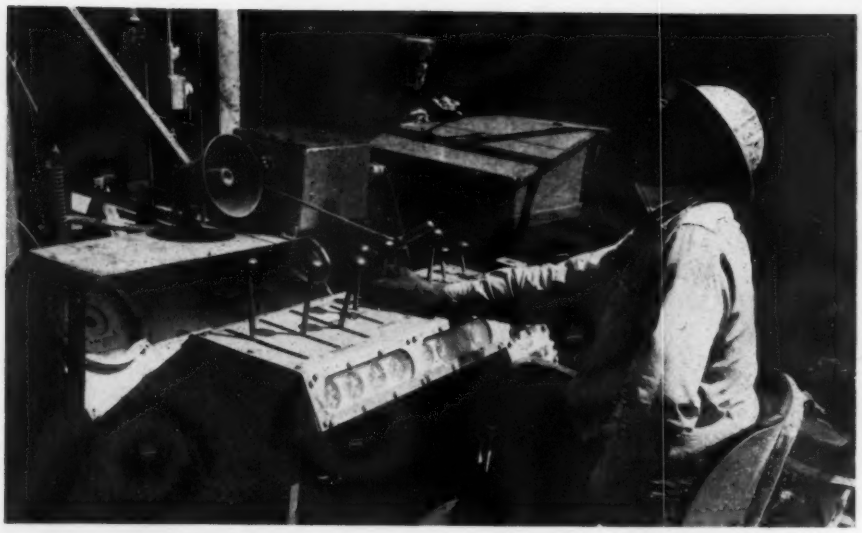
A large two-bay building, which will be used for handling and shipping the hot-rolled coils, currently is being erected at Geneva. Each bay of the building will be 425 ft. by 70 ft. Besides construction of this building, other major parts of the conversion program include installation of two additional roll stands in the 132-in. plate mill and installation of two coilers. There are now four stands in the continuous finishing group of the plate mill capable of rolling steel slabs into plates from 1½ in. to 3/16 in. thick, but with the addition of two more stands, the mill also will be able to roll strip down to 1/20 in. thick.

There is being added to the electrical system approximately 30,000 hp. of connected load in motors and about 15,000 kw. of capacity in motor-generator sets. Equipment totaling about 3,000 hp. in smaller motors, is being moved and rearranged in the finishing end of the plate mill.

Pipe rolling machine at Kaiser's Fontana, Calif., steel mill. This is the first Fretz-Moon mill west of the Mississippi. It is now turning out 90,000 to 125,000 tons (depending upon size rolled) of commercial plumbing pipe annually. Fontana is now undergoing further expansion to provide for rolling larger-size pipe (5 to 12 in. in diameter) and steel strip up to 86 in. wide. Another open-hearth furnace will increase ingot capacity by 140,000 tons yearly. Kaiser Steel produced 795,728 net tons of steel ingots in 1947, nearly all of which went to the Western market. The company now employs approximately 4,000 with pay roll in excess of $12,000,000 annually. Its facilities include a plate mill, structural mill, merchant mill and a cold-rolling mill for light-gage steel, besides the pipe



Portable electric oil well drilling rig of Shell Oil has a 123-ft. telescoping derrick, other major changes in design



Control console on derrick floor is first to give operator complete control of all phases of the drilling operation

PORTABLE OIL WELL DRILLER

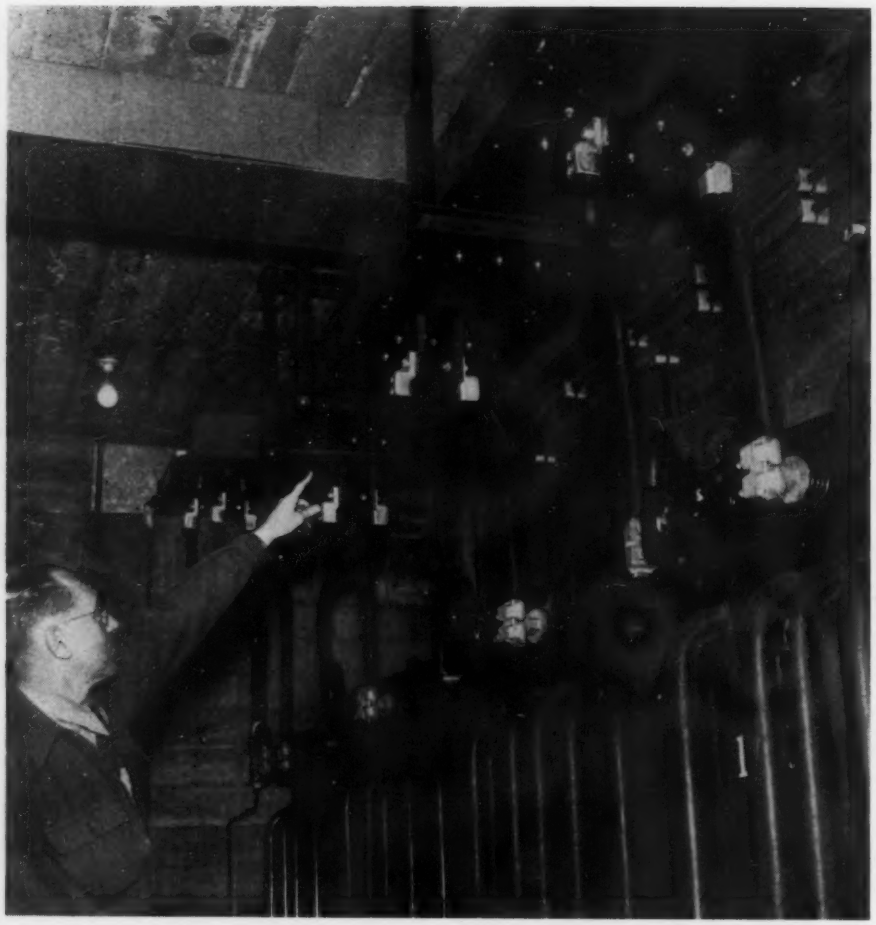
A COMPLETELY PORTABLE electric-powered oil well drilling rig has been developed and put in service in southern California by Shell Oil Co. It was designed around a special 123-ft.-high fabricated "A" frame derrick. The derrick telescopes and folds into a single 8 x 8x 63-ft. piece, which is legal to move along the highway. Mobility of the unit, which can drill down to 10,000 ft., is expected to check rising drilling costs and increase the rate of well completions.

Internal combustion-electric drive was chosen as most suitable because of flexibilty, ease in handling and compactness. Where locations are hilly, ability to locate prime movers and generators at a different location and grade from the drilling equipment will save costly excavation.

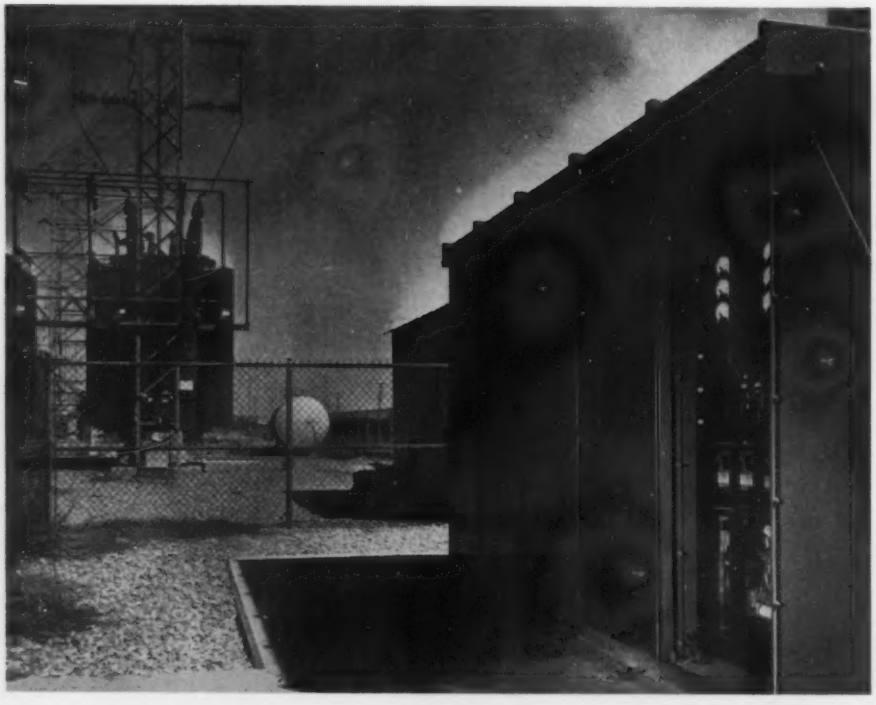
Power is supplied by three 12-cylinder engines driving three 200-kw., 395-volt, d-c generators. Two are located on one semitrailer, the third along with the control panel, on a second trailer. All connections are made by cables with quick-engaging polarized plugs.

Power is furnished to two pump motors rated 400 and 250 hp., a hoisting motor rated 500 hp., and a rotary table motor rated 250 hp. Any combination of these within the generator ratings can be set up as required by the operator at the control console. In addition to all the conventional controls for drilling, the console mounts an electronic weight indicator which uses a strain gauge to measure hook load. Other electronic devices are used to control rate of penetration, weight of bit on the bottom, and braking on the hoisting drumshaft.

Power for the rig is from three engine-generators rated 200 kw., 395 volts d-c on semitrailers. Trailer on the right also mounts control panel and cable reels



Power supply transformer bank for plant of Food Machinery Co. at Riverside, Calif. (above). Three 200-kva. transformers are for power service; one 200-kva. for lighting. Noteworthy feature of this installation is use of bus duct to connect with main switchboard. In upper foreground is shown the 3,000-amp. three-phase SAC BussWa duct, 20 ft. long leading to a 3,000-amp. breaker on the main board. At far left center is shown a similar 2,000-amp. enclosed bus for lighting service. The buses then pass through concrete tunnel to switchboard



Dependability of power supply to new Columbia Steel tin-plate mill at Pittsburg, Calif., is assured by this automatic substation of Pacific Gas and Electric Co. 30,000-kva. transformer bank is fed by two 110-kv. lines from separate sources. Utility's equipment automatically performs preselected switching sequences in case of trouble

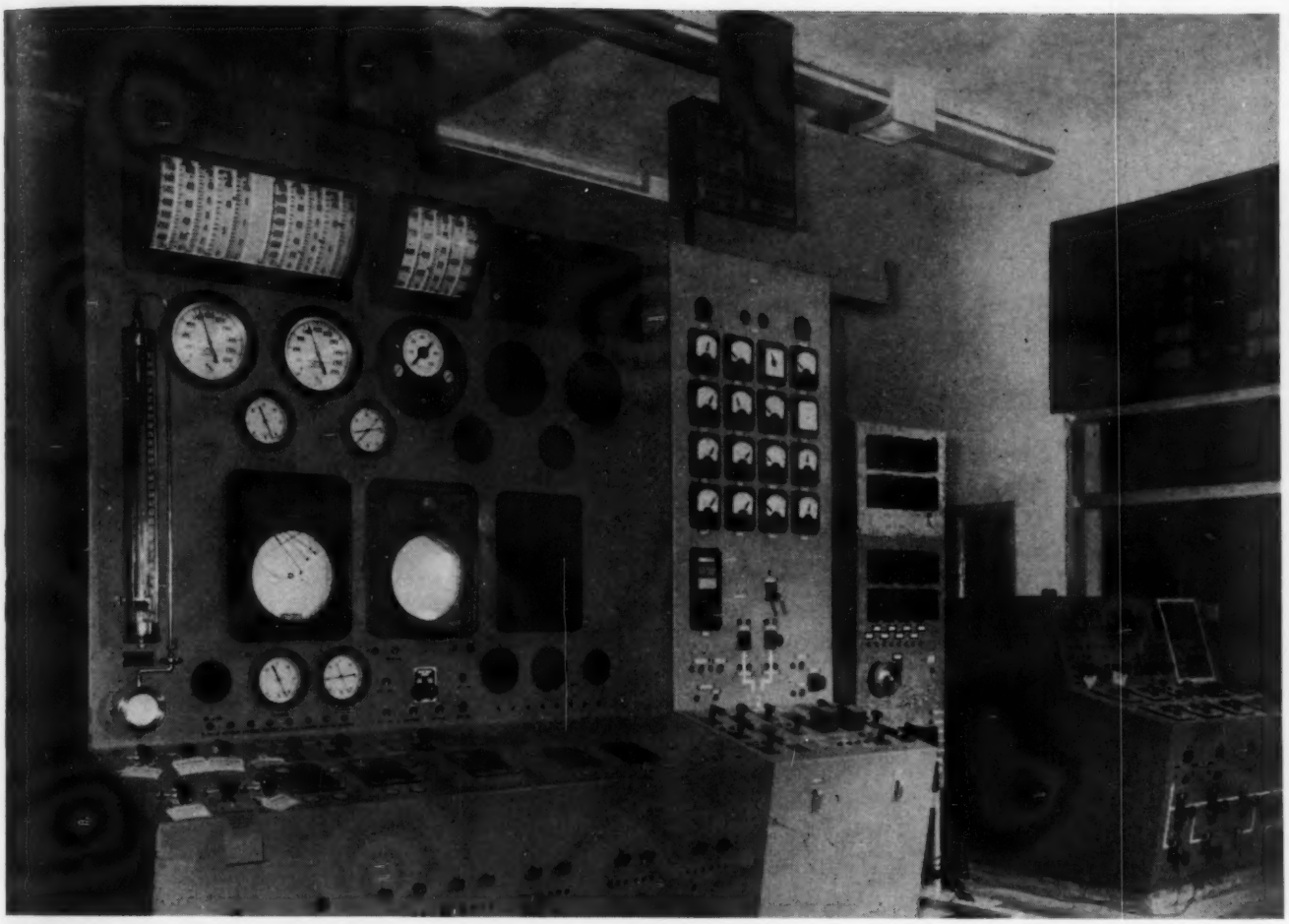
Phosphate Plant for Idaho

AN ELECTRIC FURNACE for production of elemental phosphorus is now under construction by the Westvaco chemical division of the Food Machinery & Chemical Corp. at Pocatello, Idaho. It is expected the first unit of the furnace will be ready for operation early next summer. Power for the operation will be furnished by the Idaho Power Co.

The furnace will produce elemental or metallic phosphorus, from which phosphoric acid is made. Phosphoric acid can be treated in a variety of ways for industrial, chemical or medicinal uses or in the manufacture of phosphate fertilizer. Phosphate compounds are used in detergents, soap, metal cleaning, textiles, bleaching, and for many other purposes.

Westvaco has secured 500 acres of land near Pocatello for its multi-million dollar development. The phosphate shale to be used will come from the J. R. Simplot mines 20 miles east of the Fort Hall agency on the Fort Hall Indian reservation. Eastern Idaho has tremendous deposits of phosphate that have long attracted attention. Idaho Power Co. has built a transmission line from Fort Hall to the mines, and the Union Pacific railroad is completing a 22-mile standard-gage branch line to the mines. Fort Hall is about 12 miles north of Pocatello.

The plant will have a total capacity of 34,000 kw., and the first unit to be completed next summer will have a capacity of 15,000 kw. This unit will handle 300 tons of shale a day. The shale will be calcined to drive off some of the organic materials. It will then be blended with silica, gravel and coke before going into the electric furnace. In the electric furnace operation, phosphorus leaves in the form of vapor. The vapor is then cleansed by electrostatic precipitation. Water sprays condense the phosphorus vapor into a liquid phase for shipping in tank cars. The phosphorus is kept under water to avoid spontaneous combustion. Melted shale is drawn off in the form of slag.



Master control board at Kern comprises both steam and electrical controls for entire plant. It is located on the long axis of the plant so that all major equipment, including firing aisles of boilers, is visible to the operators

CENTRALIZED CONTROL AT KERN

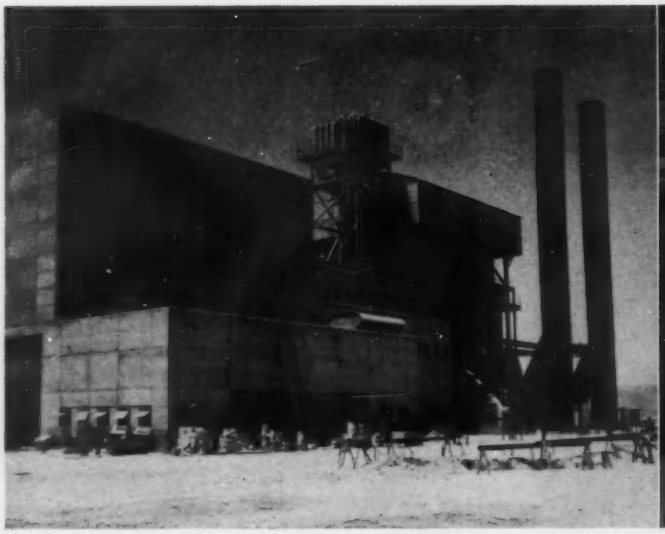
KERN steam plant of Pacific Gas and Electric Co. is outstanding in that it is the first plant in the West to have been designed around complete centralization of controls. Probably no other plant in the country goes as far as Kern in features to reduce operating labor. Operating manpower is expected to be only 50 to 60% that of a conventional plant. The Kern plant, near Bakersfield, Calif., will have two units—a 60,000-kw. and a 100,000-kw. machine. The 60,000-kw. was recently placed in operation. The second is scheduled for January 1950.

The particular feature of interest is the manner in which the plant was laid out around the control center. Operators at the master control board shown can look through large doors in either direction and see all major equipment in the plant. In one direction they can see the two turbo generators, one in either corner of the building to either side of the long axis of the plant. Main auxiliaries for each unit also visible are located on the same floor and adjacent to the main units. These include house units and condensate and condenser circulating water pumps. In the opposite direction the boilers for each unit are seen, again located to either side of the long axis of the plant.

In the central control room are to be found all controls necessary to operate the plant under normal conditions—steam, mechanical and electrical. The only controls located at the boilers are those necessary to start the boilers from a cold start. An elaborate annunciator system implements centralized control. Red, yellow and white glass windows in these annunciators serve to inform personnel of operating conditions in respective order of importance. Main electrical control boards also are located in the control center. A feature of electrical instrumentation is a new electronic frequency meter developed by PG and E. In the middle of the control center there is a glass windowed operators' observation and telephone booth. The station's control center is so complete with instrumentation and automatic devices that it is almost as though the plant were robot operated.

Kern is conventional in most other respects. Availability was controlling factor in selection of equipment. The first 60,000-kw. unit is a modified AIEE-ASME standard; 1,800 r.p.m. straight condensing, made by General Electric Co. Boilers for the first unit, two in number, are standard Babcock & Wilcox installed by C. C. Moore & Co., 1,380 psig., 935°; 450,000 lb. of steam per hour. An attemperator is used between primary and secondary superheaters to maintain steam temperature during the rapid load changes required of the plant. The second, or 100,000-kw. unit, will be 3,600 r.p.m., hydrogen cooled. Two similar boilers will serve this unit.

The plant was designed primarily



Kern steam plant (left) near Bakersfield, Calif., will add 160,000 kw. to southern end of Pacific Gas and Electric system. Plant is notable for degree of centralized control to reduce operating labor. Operating labor is expected to be only 50 to 60% that of conventional plant. At right are shown control boards for electrical end of plant

for peaking on PG and E's predominently hydro system. This called for low annual load factor during the life of the plant; also, quick starting, or ability to pick up full load in 20 to 30 seconds from a condition of floating on the line. Hence, Kern does not come up to most late eastern plants in thermal efficiency. Its net heat rate will be about 12,200 B.t.u. per kwh.

The generator is air-cooled; uses a conventional voltage regulator. The second unit will have Amplidyne control. Use of house units is a deviation in practice for PG and E. Reason: makes possible operation of the plant in case of system abnormal voltage or frequency conditions or complete power failure. Normally, house units will operate in parallel with the system through a station transformer bank with automatic throwover to house unit in case of system disturbance. House unit for the first machine is 6,000 kw. The second unit will have a 10,700-kw. machine. It is interesting to note here that total connected load of auxiliaries for this first 60,000-kw. unit at Kern is 13,700 hp.

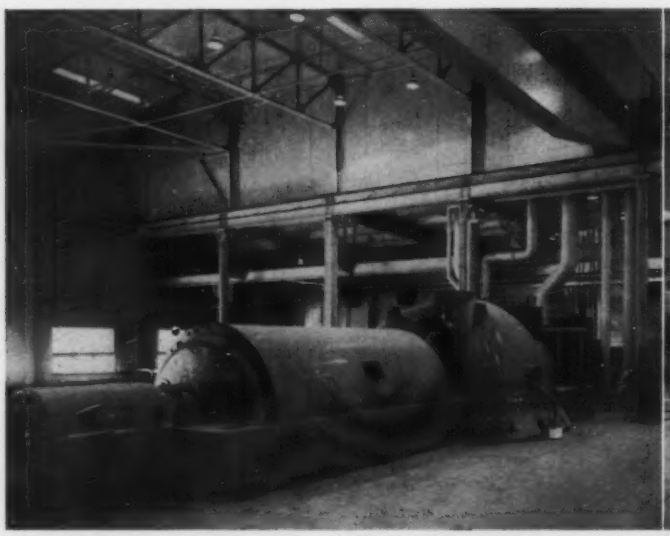
Output of the plant is fed into the system through a 110-kv. switchyard adjacent to the plant. Lines go to new Midway substation 26 miles north, the terminus of a new 220-kv. line from the north; to Bakersfield substation and also to Edison's Magunden substation for intertie.

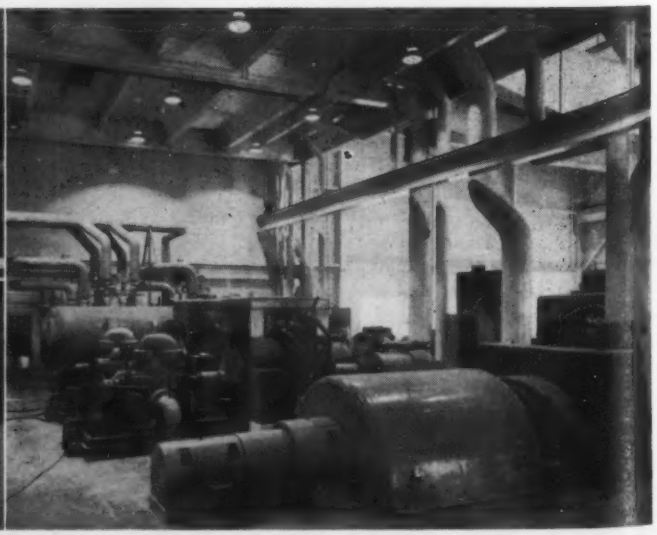
Handicaps Overcome

Kern represents more than merely a modern new steam plant to men of PG and E and the engineers and construction forces of Stone & Webster Engineering Corp., designers and erectors for the plant. There is drama and human interest back of it, too. To get the plant on the line was a race with time to make it available to help alleviate the critical power shortage in central California during the early part of this year. Air express was extensively used. In all some 20 tons of freight was flown in by air. Even motors of 100 hp. weighing 1,500 lb. each came by air. An expediter was kept constantly on the job in the east to speed up and coordinate deliveries. Jurisdictional labor troubles at the plant were no end of grief.

It is a good example of coordination and cooperation in executing a large and intricate job in record time.

First unit at new Kern steam plant of PG and E is the 60,000-kw. machine shown here. A 100,000-kw. machine is now being installed between first unit and wall to the left 6,000-kw. house unit, condensate and circulating pumps. Station auxiliaries total 13,700 hp. All major equipment is so located that it may be seen from master control board





Low Power Factor in Industrial Plants—

and what to do about it

W. C. King
Los Angeles

I. WHY WORRY ABOUT LOW POWER FACTOR?

Beginning a series on power factor correction. Writer is author of a book on the subject. He represents Electric Machinery Mfg. Co., and Cornell-Dubilier Electric Corp.

UNFORTUNATELY, a number of industrial plant managers treat low power factor in very much the same way they treat a bad tooth. If the tooth begins to ache they will go to the dentist but if it doesn't, they prefer to ignore it and think about something else. In an industrial plant the "toothache" may be when some red figures show upon the power bill as a penalty for low power factor or it may be when some of the plant circuits get dangerously hot.

Not all power companies impose a penalty for low power factor so plant management has no monthly reminder. Also, the plant feeders may still be carrying the ampere load imposed upon them without melting the conduit. Even so, the plant power factor should be checked; it is an inexpensive procedure and in a great many cases it will be found that correction of conditions will pay handsome dividends. Industrial plants have a very definite self-interest in power factor.

Benefits To Be Obtained

1. *Reduced Power Bills*—Formerly, most electric utilities tended to ignore their customers' power factor, but of recent years utility management has come to realize its importance. Most utilities serving industrial loads now adjust the consumer's bills according to the power factor conditions in the consumers' plant. These rates are of many different forms; some are based on average monthly power factor, others on power factor during peak demand. Some apply a penalty for low power factor and a discount for good power factor; others use a discount only.

On the Pacific Coast many industrial plants have found that an investment in power factor corrective apparatus will be paid off through reduced power bills in two years or less. This is a very handsome return; a 50% earning is probably far more than that obtained from the rest of the plant investment.

2. *Reduced Feeder Losses*—Good power factor reduces the losses in the plant feeders. The importance of these feeder losses is not generally realized: For example, take the actual case below:

Conductors	3—4/0
Length	300 ft.
Voltage	450
Load	160 kw.
Power factor	57%

If the power factor is improved to 91% there will be a saving of 3.8 kw. per hour; if the plant is on a three-shift basis, operating 8,000 hours per year, this will amount to over 30,000 kwh.

3. *Reduced Transformer Losses*—Where a plant has its own transformers, good power factor reduces losses in these units; it enables them to carry more load.

4. *Reduced Voltage Drop*—Improving the power factor reduces voltage drop in the plant distribution system; higher voltage at the motor terminals means better torques and lower losses.

Determining Present P.F.

Some industrial plants receive a power bill every month on which is printed the power factor and the corresponding penalty or discount. Other plants receive no such information and may have only the haziest idea regarding their power factor conditions. If management has had no experience in checking up on power factor conditions they may fight shy of it as being an involved, expensive undertaking. This is a fallacy; the information may be easily obtained in any one of several ways:

1. The plant electrician, by means of a split core ammeter, can determine the total amperes drawn by the plant. By checking this value and the voltage against the kilowatts of useful power (this can be done by counting the rotations of the disc on the power company's watthour meter), the power factor can be easily determined. This, of course, gives a spot reading and several such readings should be taken under different load conditions.

2. The power company will be found ready to cooperate. It will have a test crew either make spot readings or will set a meter for a period of a week or longer to determine the average power factor.

3. The district offices of the manufacturers of synchronous motors and capacitors usually will be equipped with test instruments. The industrial plant managers will find that the manufacturer is a good source of carefully obtained, reliable information on plant conditions.

How May P.F. Be Improved?

Assuming that we have decided to better our plant power factor conditions, how shall we go about it? The most common methods are:

1. *Rearrangement of Motors*—The most common cause of low power factor is underloaded induction motors. A 10-hp., 1,750-r.p.m. motor at half load will operate at about 77% power factor, a 5-hp. motor replacing it and operating at full load will run at 86%. There are, of course, some loads such as presses or shears, where the load is necessarily light during a large part of the time. But many plants, if they checked up, would be surprised at the number of motors that are loafing.

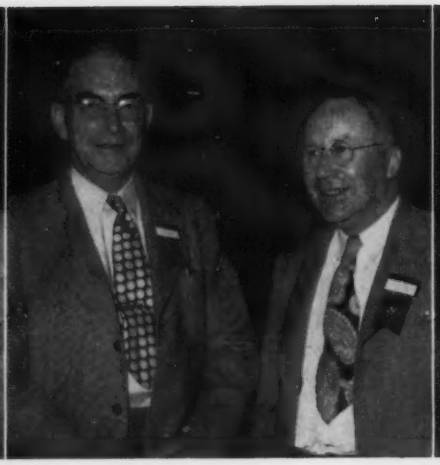
2. *Synchronous Motors*—This type of drive may be used for pumps, compressors, line shafts and many other machines where the horsepower requirements are substantial. (Say, 75 hp. or more.) A leading power factor machine not only supplies its own magnetizing current but also will supply part or all of the magnetizing current required by the induction motors in the plant.

3. *Synchronous Condensers*—The average industrial plant will find no use for a synchronous condenser. The investment required is higher than that required by capacitors unless sizes in excess of 5,000 kva. are required.

4. *Capacitors*—These units may be easily installed either at the point where power is served to the plant, on the different feeders or right at the motor terminals. Since they are made up of individual cells of from 5- to 25-kva. rating they are very flexible. In plants where all the motors are small, capacitors supply just about the only practical solution of power factor.

The articles to follow will give cost data, usually in the form of curves, which can be used to select the most efficient form of p.f. correction.

Lee McKay



Terrell McMillan

Bettannier Cone

AIEE Studies Load Growth Problems

CONTINUED growth of utility loads could well require development of all hydro reserves in the Pacific Northwest within the next 20 years. So stated Professor F. O. McMillan, director of the American Institute of Electrical Engineers, in the opening address of their Pacific General Meeting, held in Spokane Aug. 24-27. In his address "Long Range Planning for Power Supply" he went on to outline supplementary sources of power which will have to be considered. Barring an unexpected simple solution of the many problems in use of atomic energy for power, he said it appears that for sometime the great bulk of power required will come from coal.

Engineering problems posed by the continued load growth he predicted were the subject of many excellent papers and discussions from the floor. Problems of generation, switching, transmission and distribution of larger and larger blocks of power were presented, and various solutions described and discussed.

Generation

As a starter, L. B. Cowgill recounted organization and eight years of successful operation of the Northwest Power Pool. Coordinated operation of facilities has allowed maximum utilization of regional diversities, increased reliability and improved quality of service. More efficient utilization of equipment, reduced investment and more economical over-all operation have thus been realized by the ten members.

Tremendous size of hydro installations in the Northwest was illustrated by two papers. A. F. Darland, USBR, and J. L. Berry, Westinghouse, described erection of the 108,000-kw generators at Coulee Dam. Members who visited the dam on a field trip later in the week saw nine of the units in operation and three of the remaining nine under construction. Ultimate development of Coulee and the Columbia Basin Project was described in a paper by S. M. Denton, USBR, presented by A. C. Conger. Six of the Coulee generators will supply power for twelve 65,000-hp. synchronous motors driving irrigation pumps. One or two motors will be started in synchronism with one generator. They will be connected at standstill and field applied as the turbine gates are opened. Motor and generator will be brought up to full 60-cycle speed and placed under control of the hydraulic governor. Generator capacity will be available to the power pool during non-irrigation seasons. Pump operation will be integrated with Coulee so peak capacity will be available even during the pumping season. The Granby pumping plant installation in Colorado was described by F. M. Wilson, USBR. It will divert water from the west side through a tunnel to the east side of the continental divide. The pumping plant will use only 6% of the energy generated as the water subsequently passes through seven generating plants on the east side of the divide.

General trend in hydraulic turbine design is toward better and more economical use of welded steel plate, said W. J. Rheingan, Allis-Chalmers. Increased use of stainless steel for turbine parts used in contact with high-velocity water is materially decreasing maintenance costs, he added. Extension of transformer design for the larger rating now required has involved the same old dielectric, mechanical and thermal problems, said W. G. James, Westinghouse. Higher transmission voltages will apparently offer no unexpected problems, and manufacturers see only obsolescence as a limit in transformer life.

Switching

Factors leading to adoption of the 230-kv. solid-ring bus which will be

Starr Bellaschi

Peterson Schultz Kilgore Darland Dexter Cozzens

installed at Coulee in 1949 were presented by N. G. Holmdahl and C. L. Killgore, USBR. Flexibility, simplicity in operation and relaying, ease of maintenance and maximum stability at most reasonable cost were the most important. Discussion from the floor emphasized that the ring bus may not be the best solution where higher interrupting duty on other parts of the system is a serious problem. A companion paper by B. V. Hoard and E. E. Helwith, Bonneville Power Administration, described the transmission system from the Coulee power plant. A transmission grid of ten 230-kv. lines and three or four 115-kv. lines will be used. Increased line loading with greater stability justify the greater cost of new 10,000,000-kva. circuit breakers required for the much higher interrupting duty.

Transmission

Problems of high-voltage transmission—economic as well as technical—were treated in half a dozen papers. Careful analysis of competitive means of transporting energy was urged in

Smith Harris

a paper by R. E. Pierce and E. E. George, Ebasco Services. Results of tests on the experimental 500-kv. French line were detailed in a paper by Francois Cahen, presented by C. F. Wagner. The French tests show operation at 400 kv. or more to be satisfactory, with the upper limit being dependent on radio disturbances rather than losses by corona. Definite preference between expanded or bundled conductors has not yet been established.

Two methods of locating faults on transmission lines were decribed. G. B. Tebo presented a paper by J. R. Leslie and K. H. Kidd, Hydro-Electric Power Commission of Ontario, on the Linascope—an echo-ranging type fault locator. It measures time required for a d-c pulse to reach and return from a fault on the line. The fault is shown as a pip on a cathode ray oscilloscope tube. Distance to the fault is shown on the tube by distance from a marker pip indicating the beginning of the line to the pip indicating the fault. The device has operated successfully on energized lines, by sending a high-frequency pulse through a coupling capacitor.

Two versions of a fault locator using fault-generated surges were described by R. F. Stevens and T. W. Stringfield, BPA. One uses the first surge from a fault to trigger a timing device. It then records photographically the time for the surge to make the round trip to the fault and return. The second version has a timing device at one end of the line. A communication link is triggered at the opposite end of the line by the surge from the fault, sending a signal to the timing device. By comparing the time for the surge to reach opposite ends of the line, the fault is located. Other papers covered advances in telemetering, joints and clamps for aluminum conductors, and some original investigation of the space charge due to corona.

Distribution

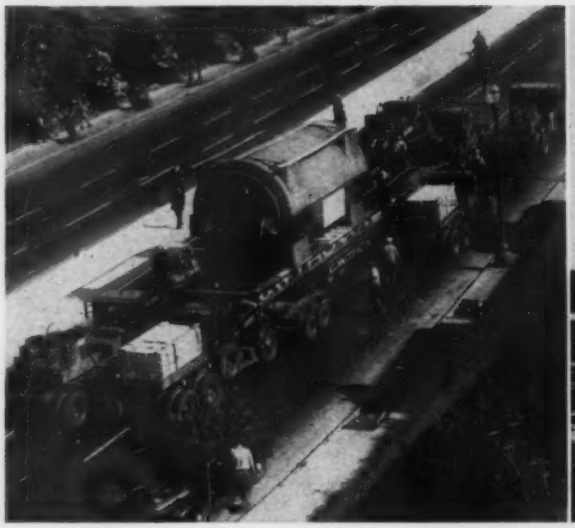
Importance of planning system expansion well in advance of load growth was stressed in a paper by J. F. Sinnott, San Diego Gas and Electric, and L. D. Madsen, General Electric. Such planning, utilizing standard equipment and standard voltage levels adequate for increased loads ultimately results in substantial savings in time and money.

Development of the 13-kv. sub-transmission system in Spokane was outlined in a paper by E. G. Peters and E. Baughn, Washington Water Power. Steps in streamlining the distribution system were illustrated by slides showing the remarkable progress made in nine years. Pole lines have been cleaned up by reducing number of feeders, eliminating series lighting conductors, primary kickbacks, heavy corners and close spacing.

Latest development in the cash register of the industry was described by H. E. Trekell in a paper on the magnetic suspension of the new G-E watthour meter rotor.

A session on general industry applications included electrification of an ore haulage system; 13.8-kv distribution in a mine; a hydraulic log barker; and sectional paper machine drives with multiple generators. A session on electronics, a new conference on nucleonic instruments, and two student sessions completed the technical program.

E. S. Lee, president of the Institute, was introduced at the opening session by General Chairman Richard McKay. He left with the members a challenge to go out and earn the recognition they think they deserve. His address, along with excellent inspection trips, golf and the final banquet rounded out a meeting well-enjoyed by the 375 registered members and guests. All were invited to attend the Pacific General Meeting in San Francisco next August.



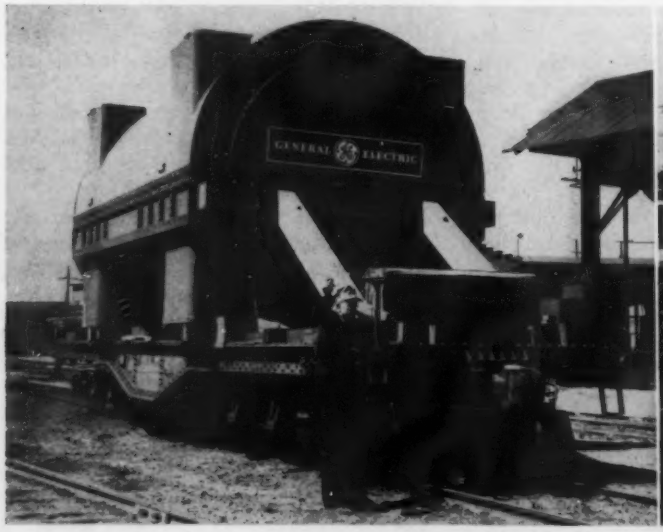
The mountain was moved to Mahomet, figuratively speaking, when this completely assembled stator of a 100,000-kw., 3,600-r.p.m. generator was moved over San Francisco streets to station P steam plant of PG and E. Seventy-four rubber-tired wheels were used on a specially built trailer to transport the stator. Truck and cargo weighed 230 tons

100,000-KW. STATOR SHIPPED ASSEMBLED

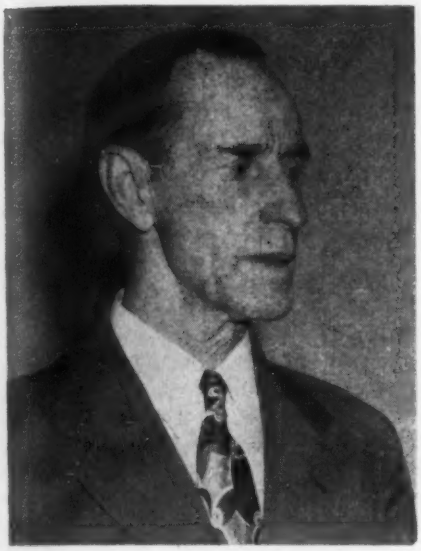
IN THIS AGE OF BIGGER and better comes the unusual feat of shipping and trucking the completely assembled stator of a 100,000-kw. generator from the Schenectady works of General Electric Co. to the station P steam plant of Pacific Gas and Electric Co. in San Francisco. This is the first instance where a unit of such size has been shipped completely assembled. It constituted one of the heaviest and largest single railroad freight shipments on record. One of only three flat cars in the country capable of carrying such a load was used. The car has eight axles and sixteen wheels, double that of the ordinary car.

From a siding in San Francisco the 178-ton load was transported by special truck to Hunter's Point, location of station P. The specially built truck weighing 55 tons had 74 rubber-tired wheels, making total weight of truck and cargo 230 tons. Motive power was supplied by five trucks, or tractors, as they are called, pulling, and two pushing, as shown. To get the caravan safely down a grade on Bayshore Highway, it was necessary to ease it down with the winch pictured. For braking on the immense truck, the air compressor shown had to be installed. Seven hours were required to transport the load the eight miles over San Francisco streets. The unusual haulage job was undertaken by G. W. Thomas Co.

Eight-axle flat car, one of only three such cars, was used for shipping assembled stator 24 ft. long by 12½ ft. in diameter and weighing 178 tons. Taking no chances on the truck getting away on a down grade, a winch was set up to ease the 230 tons down a grade on Bayshore Highway. Truck had own air compressor for supplying air for braking



INSPECTORS TALK NEW CODE PROCEDURE



Fisher

FIRST chance to meet and become acquainted with the new secretary-treasurer, Charles L. Smith, successor to the late and well-loved Victor H. Tousley and first opportunity to hear explained the new procedure for making and revising the National Electrical Code, was given to three successive section meetings of the International Association of Electrical Inspectors last month. These were monumental enough changes in themselves to dwarf any suggestions for a change in the code itself. Each of the three section meetings, in Denver, Salt Lake City and Oakland, were favored with a group of national speakers. In each case many local speakers presented new things or explained methods and materials not yet fully accepted. The Western Section, embracing much of the Middle West, came to Denver, at the western edge of its territory, for the first of the annual section meetings, Sept. 13-15. The Northwestern Section met at Salt Lake City, the eastern edge of its territory, Sept. 20-22. The Southwestern Section followed at Oakland, Sept. 27-29.

James G. Fisher, superintendent, electrical department, Mississippi State Rating Bureau, Jackson, Miss., and IAEI president, accompanied Charles Smith. Citing the much greater hazard in small towns and farms, Fisher urged assisting electricians to understand the code. Because the average electrical job today involves so many rules from so many different articles throughout the code, even the good electrician is confused. He urged a small edition, containing only those articles of the code applicable to average wiring of a small town or farm, approximately half of the present code. Reference could always be made to the standard code for industrial or complex installation. Likewise he asked that articles be run in the News-Bulletin of special interest to the small-town electrician and inspector. While the code is not intended as a textbook or instruction manual for the beginner, and to conserve space the rules have been worded as briefly as possible, he felt that many are insufficiently expressed to be readily understood. He hoped that such a code for small municipalities would be made available by the sponsors of the code.

Charles Smith fills shoes that are hard to fill. In each of the meetings members of the Executive Council who had helped in his selection explained the procedure and urged full cooperation with him. Smith himself candidly reviewed his own background and education to illustrate a practical knowledge as well as hard-won scholastic education to fit him for the task.

He then explained the situation during and following Mr. Tousley's last illness and the reorganization of the office staff. In giving his concept of his responsibilities, he gave the first complete summary heard by many of the purposes of the field service of National Fire Prevention Assn. and how it coincides with the objectives of IAEI.

Smith also brought a clear-cut explanation of the reorganization of the Electrical Committee of NFPA into an Electrical Section with a smaller correlating committee. The revisions of the code, he explained, can originate as suggestions from anyone and may be channeled either directly to NFPA. the correlating committee, or to article panels made up of people interested in each phase of the article in question throughout the country. All such suggestions will be studied by the panel and referred to the correlating committee.

It is intended, said Smith, to issue complete revisions of the code only at four- or five-year intervals. In the meanwhile, interim amendments may be issued by the correlating committee and each year a supplement to the previous edition will be issued to accompany that edition. These supplements will be arranged so they can be pasted into a Code book for practical immediate reference.

Each of the section meetings had similarities and differences. Speakers who addressed all three of the meetings included J. J. Siddall, H. H. Robertson Co., Pittsburgh; H. H. Watson, General Electric Co., Bridgeport; Howard W. Kelsey, director, Safe Electrical Code Program, NEMA, New York City. Sam Rosch, research engineer, Anaconda Wire & Cable Co., Hastings-on-Hudson, New York, addressed the Denver and Salt Lake City meetings. J. H. Stumph, chief engineer, Pacific Coast Division, United States Rubber Co., presented the "Uskon Radiant Home Heating Panels" at Salt Lake City and Oakland, and Howard Weber, U. S. Rubber Co., did so at Denver.

That inspectors constitute a vital link in the building industry and must seek constantly to raise themselves in the public respect, was the message of Siddall. He told how manufacturers are dependent on inspectors for insurance against the misuse of their materials. The public is dependent on inspectors for maintenance of safety. The obscurity of the electrical inspector and the lack of appreciation of his work by the public could be changed if the inspector would make use of his spare time to let the public know, let the city fathers know, and let the industry know of the responsibilities which codes for safety place upon the inspector. He urged inspectors to keep trying to raise the standards, not so much of installation alone, but of public respect for their work.

Artificial restrictions placed on installation of low-voltage relay control of lighting circuits, H. H. Watson told the meetings, were unsound. If low-voltage relay control was unsafe in

Smith

any particular, then so are all door chime, door bell, furnace control and other low-voltage circuits, and should likewise be condemned. The relay system, he said, in no manner alters any traditional method used for handling of full voltage. Neither is it different in loading or safety from call bell, door bell or chime installations. What the system does is merely to shorten the switch loop. Much of his paper will be published later.

Kelsey outlined the new publicity plans which the electrical cord group will embrace. Besides the flag label on cords and cord sets and publication of the booklet, *Electrical Safety in Every Room*, mailings will be made to fire chiefs, schools, utilities, the Red Cross and others, explaining the importance of teaching safe use of cords.

Colorful Sam Rosch, armed with samples of a variety of synthetic products, picked up a challenge made at the Denver meeting by George Andrae. Andrae had asked why the manufacturers couldn't provide one universal wire insulation, suitable for all types of installation. Such a wire cable, said Rosch, to be ideal must be capable of installation in every wiring method, including knob and tube or raceway. It must be suitable for use in moist locations, resist oil and resist gasoline, so far the most destructive substance to insulation of all kinds. The TW types of wire, he illustrated, are the only ones which meet all of these requirements. The code, however, doesn't yet recognize some other newer synthetics, such as silicones, said Rosch. He predicted a trend to higher operating temperature in order to load the wires to greater capacity.

Characteristics of the radiant heating panels made from conductive rubber built into a wallboard was described and shown by J. H. Stumph. He explained the principle of radiant heating vs. convection heating and claimed superiority over other systems for these panels if placed in the ceiling. The ceiling provides the maximum available area not blocked off by furniture for radiation. The panel heating enables lower air temperature, reduces circulation to a minimum, riddance of humidity in the air and reduced shock effect when entering the heated room from cold outdoors or vice versa. He claimed less stratification of air, reduced heat losses through walls and windows and complete elimination of all exposed heating equipment. The elimination of heating equipment in itself and all complex controls and maintenance were cited as great advantages. Questioned as to the cost of such a system, he made no bones about it costing more than other heating systems, but said that once the public decides it wants electrical heating, nothing will stop it, regardless of cost differential.

Alcock Cales Moore Radtke

Western Section, Denver

When engineers and architects disagree on electrical installation procedure, manufacturers of prefabricated houses are at a serious disadvantage in their efforts to improve their products. William H. Slavin Jr., electrical inspector in Chicago for the municipal department of gas and electricity, dealt with "Prefabricated Homes Light Up" at the first day's session at Denver.

Slavin urged that suitable code rules be adopted for the guidance of manufacturers who desire to lay down prefab buildings as nearly complete as possible. To accomplish this end, he pointed out, it will be necessary to study the varying requirements of towns and cities throughout the nation, and then establish minimum standards applicable to all, or most localities.

Panels with cables built in are made at some prefab plants, Slavin said, and shipped to communities where they meet structural and electrical requirements, but some inspectors require completely dismantling the electrical system before they are willing to accept responsibility. The speaker sounded an optimistic note with: "Progressive steps are being taken to solve this knotty problem." He added that a solution must be found, and quick, since prefabricated structures are here to stay. The industry is firmly entrenched, making mandatory a coordination of local building regulations and electrical requirements of customers within the scope of manufacturers' ability to satisfy all parties concerned.

An address by George Andrae, president of Herman Andrae Electrical Co., Milwaukee, on "Code Comments by a Contractor," embodied a recommendation that industry members intensify their studies of the national code. A thorough knowledge of code permissives and restrictions, he said, would eliminate many errors and provide a guide for speedier completion of jobs.

A veteran of 20 years' service on the Wisconsin code committee, 16 years on the Electrical Committee, and a member of the new correlating committee of the National Electrical Code in NFPA, Andrae also suggested that many electrical difficulties would be bypassed if contractors would share their experiences—good or bad—with others. No use for contractors to go on making mistakes and tearing out installations when, by the simple exchange of knowledge at inspectors' meetings, such time and money-wasting efforts could be avoided. Andrae's hobby has long been, and still is, a simplification of tables to eliminate odd sizes of wiring. He also wants standardization of wire insulation and a grade that is oil and gasoline resistant.

Much of the code questions and answers period, led by O. K. Coleman, inspectors' problem committee chairman, concerned electrical installations which should, or should not, be built for emergency light and power. Hospitals were the favored type of institution under discussion. Stand-by plants to cut in when regular power sources fail were out of the picture, most disputants asserted, because of excessive cost and maintenance ex-

Watson

pense. R. P. Northrup of Crouse-Hinds Co. had talked on explosion proofing hospital wiring. Here again, local conditions of service and other factors make hard-and-fast standardization impossible, it developed.

W. C. Cale of Canadian Standards Assn., Toronto, Ontario, was elected president of the Western Section at the end of the meeting; W. J. "Scotty" Alcock of Underwriters' Laboratories, Chicago, first vice-president; O. E. Radtke, Cleveland, second vice-president and Fort H. Moore, Indianapolis, secretary-treasurer. Victor C. Moulton, Mountain States Inspection Bureau, was general convention chairman, assisted by E. P. Hodges, Austin Dunham, T. J. Vieu, Floyd Brown, Clarence Hockom, Mrs. L. A. Barley, T. P. Treadwell, John Malpiede, C. B. Farrah and T. M. Foulk.

A special event of the Denver meeting was the presenting of charters for new chapters to New Mexico, South Dakota and to Ontario.

Gaffney Wolters Dickey Grant Stayner Carlisle

Northwestern Section, Salt Lake City

L. W. Carlisle, chief inspector, Eugene, Ore., president of the Northwestern Section, mentioned the increase in wattage of ranges and appliances as one of the problems confronting the industry. Service capacity is no longer adequate to serve driers, space heaters, home laundry equipment, etc., all demanding higher wattages. Another problem concerns the installation of wiring by more people who lack competence to do so. He urged help in the training of apprentices.

W. R. Volheye, state inspector of Oregon and past president, IAEI, explained the events leading to the selection of Charles Smith. W. L. Gaffney, Tacoma, chief inspector and Northwestern Section secretary-treasurer, reported a loss in membership during the past year and also explained the size of the secretary's task.

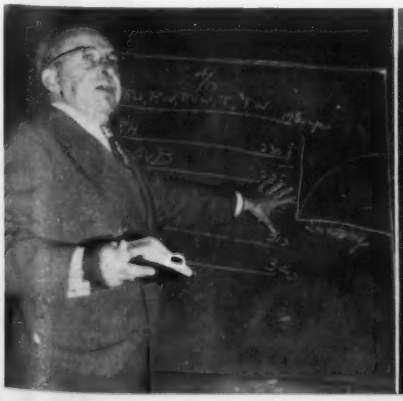
Another heating talk was presented at the Salt Lake meeting when Harold B. Swaner described an experimental reverse-cycle heating and cooling heat-pump installation installed in the home of W. A. Huckins, sales manager, Utah Power & Light Co. With charts he explained the operating theory and details of this particular installation, which draws its heat from the earth. (Story to appear later.)

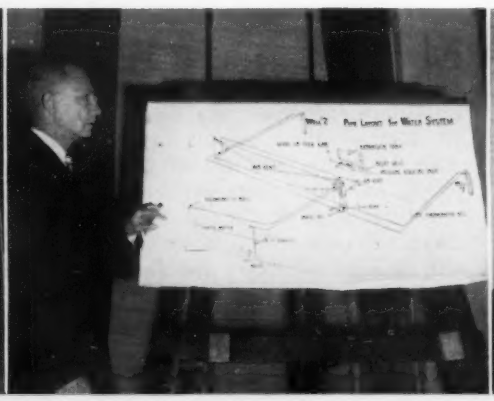
H. G. Ufer, Western superintendent, Underwriters' Laboratories, Los Angeles, for the benefit of the newcomers to the group, explained the relative positions of the National Board of Fire Underwriters, the National Fire Prevention Assn., and Underwriters' Laboratories. He described how the labeling service operates and said the Laboratories welcome constructive criticism and comments. Field experience from inspectors was highly desired by the Laboratories, in order to balance the theoritical laboratory testing. He announced revision of attachment plug standards and described the training of new personnel in the Laboratories to take care of the increased work. He then introduced C. R. Welborn, president of Underwriters' Laboratories, who echoed Ufer's request for ideas and suggestions from inspectors. He credited the criticisms of the Southwestern Section with the recent improved handling of listings in the Underwriters' lists. He proposed that the hazardous location equipment be removed from the regular list and published separately. That would eliminate 106 pages, yet any who requested the hazardous location list could have it.

D. R. Allsop, Westinghouse Electric Corp., Salt Lake City, explained the "Great Power Factory Mystery" by means of an ingenious demonstration board. He illustrated how power factor could be improved by adding capacitors to the system. With generating capacity in short supply, the importance of power factor correction is increased, for it requires less generating, transmission and distribution equipment to serve loads of high power factor.

Prior to a visit to the Kennecott Copper Corp. open-pit copper mine at Bingham that afternoon, R. J. Corfield, electrical engineer, assisted by J. S. Pearson, described the building of a new electric railroad 14 miles long, between the mine and the smelter. The mine, he said, was a huge earth-moving project. He showed slides of construction details of the

Rosch Swane: Grant Carlisle Volheye





electrical system serving the electric locomotives.

Dr. Adam S. Bennion was the banquet speaker, presided over by Howard W. Price, president of the Intermountain Electrical Assn., Tuesday evening. He gave a passionate address on the opportunities under the American system. First he reviewed the job that has been done during the past 66 years in the industry. While Americans have come to this country from all over the world and are welcome when they come here to build, he said that those who come to destroy should be sent somewhere else. It is time, he said, to stand on principles and to keep the country one for free men.

Sales control problems occupied most of the first code breakfast on Tuesday, over which I. B. Sturges, sales control inspector of Portland, presided. Cheap mail-order materials and appliances, unapproved and coming from Chicago and Los Angeles, constitute one of the major difficulties. Aluminum conduit, completely destroyed by fire, was shown. Servicing and repairing of appliances to keep them in conformity with safety standards was also discussed. Opinions were expressed that licensing and examination of repair people may help. Lack of labeling on floor lamps was especially criticized. The acceptability of Electrical Testing Laboratories labels was discussed. Since the ETL differs in operation from Underwriters' Laboratories and does not publish or keep up lists of approved appliances or make factory inspections, the ETL labeling was not considered equivalent to UL, although individual reports show high reliability.

The second code breakfast, over which L. B. Johnson, General Electric Co., Salt Lake City, presided, was spent largely discussing difficulties with the use of switches or breakers on every class of service entrance equipment rather than having a single disconnecting means. This subject later appeared in the code revision discussion Wednesday and a motion was passed to request code revision to require a single disconnecting means for each class of service in buildings used for public assembly, such as schools, theaters, etc. It was conceded that in industrial and commercial buildings having competent maintenance electricians, such installations could be handled safely. Although several other code subjects were discussed, no other action was taken.

Officers were advanced along the line of succession, to make Ralph R. Grant, chief inspector, Havre, Mont., president of the Northwestern Section; D. J. Wolters, chief inspector, Salt Lake City, first vice-president; A. E. Dickey, state inspector, Boise, Idaho, second vice-president; W. L. Gaffney, Tacoma, chief inspector, secretary-treasurer. The Executive Committee elections included L. B. Garff, Chris Claw, R. A. Church, Tom Widrig, J. Hyde Stayner and R. A. Carlisle, retiring president. W. L. Gaffney was also named the member of the Executive Council.

Butte was selected as the place for the 1949 convention.

Responsible for the exceptionally generous and enjoyable entertainment and facilities for the meeting was a committee headed by L. B. Johnson as general chairman, also in charge of reception, and including C. F. Grant, entertainment; D. J. Wolters, contributions; L. E. Baty, finances, badges, registration and photos; J. Hyde Stayner, hotel; C. W. Stone, publicity; Mrs. D. J. Wolters, ladies; A. E. Fleming, program; Ed Eardley, trips and transportation; L. John Christensen, exhibits; S. B. Cooper, golf. Charles Coleman, Adequate Wiring specialist, was cook for an excellent picnic dinner at Saltair, furnished by the Utah Power & Light Co. The manufacturers' exhibit at this meeting was exceptional in size and scope, due to the efforts of John Christensen. It was held over to the end of the week for the Intermountain Electrical Assn. conference.

Southwestern Section—Oakland

More of the time at the Southwestern Section meeting in Oakland was devoted to code discussion than at other meetings but even that was not enough to go through the entire code. Weary at the end of three days of meeting, the section voted to pass to its executive committee the review and consideration of many of the most important of the proposed code changes — in particular the detailed recommendations of the Southern California chapter committee on Article 430. Only important change voted was one to require equipment of sufficient interrupting capacity for the maximum voltage and current employed in service feeders. Other points, although discussed at length, were for minor changes and clarification of meaning.

The Southwestern Section's 25th annual meeting, presided over by Harry C. Moore, Modesto city electrical inspector, president, was its biggest ever, with 197 men and 86 women registered, and an entertainment, exhibit and arrangements mark set by the Oakland convention committee that will be hard for those who follow. The program contained fewer speakers and more discussion. President J. G. Fisher, Secretary Charles Smith, J. H. Stumph, H. W. Kelsey, H. H. Watson and J. J. Siddall presented much the same addresses reported in the foregoing from the other section meetings. The talk on power factor and capacitors in this meeting was given by R. K. Collins, Westinghouse Electric Corp., Los Angeles.

Radiant heating, low-voltage lighting control systems, wire insulations suitable for high-voltage cold-cathode installations, wire to withstand gasoline exposure, and the attempt of sign and neon contractors to apply methods permitted for outdoor lighting when lighting interiors drew the most comment.

When Harry Dobson, Santa Barbara inspector, reported on electrical fires, he presented charts showing trends in types of electrical fire. Refrigerator motors lead the list, electric irons left on come next and cord wiring third in frequency of causes, and Christmas tree strings increased in number through the war years, through neglect. Dobson noted a dropping off in numbers of all types of fire cause now, except misuse of cords. Fires also follow population increase curves, he noted. Fires actually due to the wiring itself are very few.

Electricity is the cause, however of many industrical accidents, Gilbert Bailey, California Division of Industrial Safety, reported. Chief cause is still contact with trolleys and cranes or other equipment contacting high-voltage lines. Deaths from electrical causes decreased but number of accidents increased since last year. Bailey also announced a new machine tabulating method to be employed by the department soon.

After Stumph had presented the conductive rubber panel for radiant heating, Delbert Hansen, chief inspector, Oakland, followed with a discussion of some adverse experiences with radiant systems in which the resistance wire is imbedded in either concrete flooring or in plaster walls and ceilings. Due to a leak in a water heater, he reported, one installation in a floor, in which resistance wire was laid on celotex and covered with magnesite, allowed a potential to be set up between the floor and any plumbing fixture. The fixtures had not been bonded to water piping. Hansen felt that any element embedded in plaster or concrete should have a covering (such as a lead sheath) capable of being grounded to eliminate possibility of shock due to some form of insulation failure.

When sign tubing is used for interior illumination, be it in a dim cocktail lounge or a home or office, the lax rules regarding outdoor outline lighting should not apply, the inspectors felt. They voted a request for a definition to place such installations under

interior wiring rules. Action was also taken on a suggestion by Harold Gerber, former inspector, now a consulting engineer, to require interrupting capacity capable of taking the full voltage and current in service feeders. With more buildings connected to network systems, this problem has become acute and without such devices to take the maximum short-circuit value serious accidents may occur.

Water softeners, connected to the water piping system by means of pieces of hose, it was pointed out in code panel discussion by Larry Trim, panel chairman, often interrupt the continuity of the grounding in a building. A bonding connection around the water softener should be required, he advocated.

Attending the convention from Hawaii, John Thomas Carey, inspector of Honolulu, complained repeatedly about the deterioration of many types of equipment and wiring materials under the humid tropical conditions of the islands. Insulation goes to pieces, conduit corrodes, electrical metalic tubing has no life at all, non-metalic sheathed cable rots or is attacked by rats and termites. He was assured by Smith that the code committees would go into the entire subject of methods and materials for tropical climates. Carey also brought applications enough for the starting of a chapter in the Hawaiian Islands.

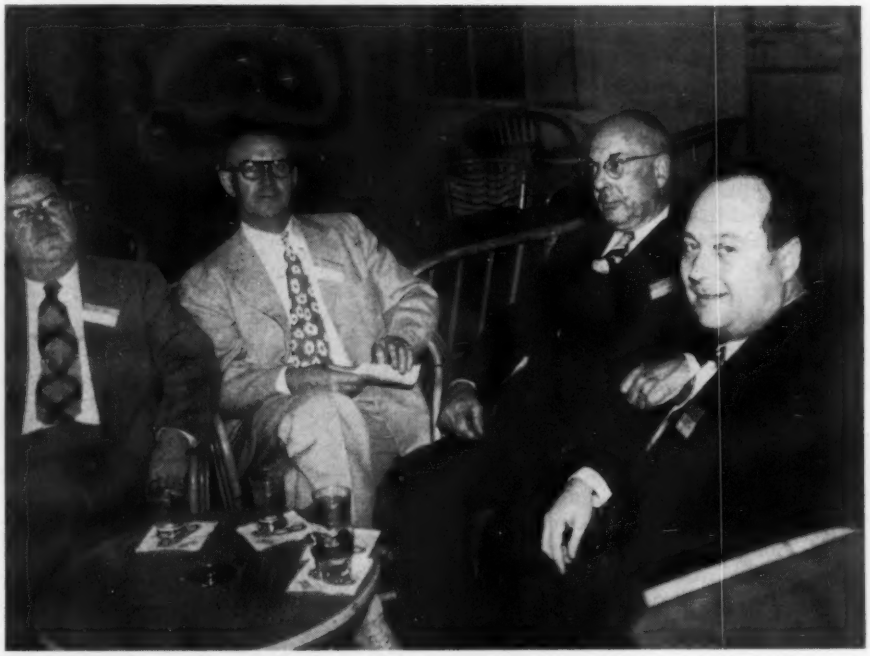
Low-voltage wiring for light control was a controversial subject, an entire code breakfast session being devoted to it on Wednesday. Objections to the system, similar to those published in ELECTRICAL WEST in July, p. 65, were advanced. Many were later answered in H. H. Watson's talk and in his answers to questions. Chief objection seemed to be that boys and home owners would tamper with the system, perhaps eliminating the relay if it failed and cutting the control wires over to full 110-volt current. Another objection raised was that most ordinances exempted low-voltage systems from inspection and it was recommended that an ordinance like that passed in Fresno to include such wiring in the inspector's jurisdiction be passed.

Code discussion panels were led by Larry Trim, chief inspector of Burbank, and by Harold Gerber, consulting engineer. On these two panels appeared A. C. Veit, Ben Hill, Charles Smith, J. G. Fisher, Karl S. Geiges, Howard Dodge, Harold Gerber, L. O. Trim, Robert Maxwell, Jesse K. Ross, L. B. Sterling, C. R. Michael, and G. J. Tansey, However most of the discussion came from the floor.

At the election of officers Jesse K. Ross, city electrician, San Bernardino, was advanced from first vice-president to president; R. B. Maxwell, assistant city electrician, San Jose, to first vice-president; E. J. Muller, Division of Industrial Safety, Los Angeles, second vice-president; and H. G. Ufer was re-elected secretary-treasurer. H. C. Moore, Modesto inspector and past president, went on the executive committee; L. O. Trim, Burbank inspector; H. K. Winterer, General Electric Co., Los Angeles; and Clifford McClelland, Division of Industrial Safety, San Francisco, being the other members. B. F. Wiesinger, San Francisco inspector, was named a member of the executive council for the Southwestern Section succeeding Ben Hill, retired. Other members remaining on the council are A. C. Veit, J. L. Ambrosi and H. G. Ufer. Because of the reorganization of the Electrical Committee, NFPA, members are no longer elected to it. San Diego was selected as the place for next year's meeting.

Heading the annual meeting committee was Larry H. Soare, superintendent, Electrical Division, Oakland with Delbert H. Hansen, chief inspector, James Ambrosi, Joseph Lyle and Horace Lee, inspectors, doing a lion's share of the work, assisted by Leo Kass, PG and E, Henry Muller, Westinghouse Supply Co., R. V. Carey, NECA, S. E. Rockwell, IBEW, R. D. Johansen, Alameda, Howard Sipe and Bettie Jackson, Chamber of Commerce, V. E. Martin, photographer and the exhibit committee headed by T. O. Gerlishe, E. L. Johnson, R. R. Robinson, R. E. Straus and James Land.

Veit, Hill, Smith, Fisher, Trim, Geiges, Dodge, Gerber



Nema group—Price, Dreher, Cowles, Kelsey

Electrical West—Vol. 101, No. 4

Commercial Building Rewiring

Changes in the 1947 Code and new materials now provide the consulting engineer with more economical methods for use in modernizing existing commercial installations and for lower-cost design in new installations. A paper presented before recent PCEA San Francisco convention

TODAY, in planning modernization of commercial buildings, both in new and existing installations, the engineer has been provided with many new ideas, regulations, and materials with which he can plan and produce electrical installations with greater efficiency and at less cost than previous installations, even with present-day increases in costs of both labor and materials. The public has become light conscious. Today the general public, the state and the government are including as criteria, minimum light intensities for specific sections of commercial installations requiring specific foot-candle intensities for the duties performed. Today, it is no longer possible for an owner to erect a building and install a minimum amount of wiring in order to rent to a tenant who finds the installation inadequate for his particular needs and extends the present installation in a haphazard manner to supply a minimum amount of lighting.

Code Changes

The 1947 edition of the National Electrical Code includes many changes, which have done much to help in the modernization of commercial buildings. If you erect a building at this time, and it is of the commercial type which might be a store, then you are required to provide service conduits and conductors, feeder and circuit wiring, distributed as evenly as possible, to provide not less than three watts per square foot for the total area, with a demand factor of 100%. To this must be added additional special circuit requirements such as heating, power, etc. These same types of requirements are applicable to other types of commercial installations.

In commercial buildings in existing installations where wiring raceways are concealed in the building structure, it is now possible to provide additional capacity with the use of approved thin-wall insulations. As many as four 2-wire circuits, two 3-wire circuits, or two 4-wire circuits may be installed in an existing ½-inch conduit without altering or repairing the building structures. Existing panelboards in older-type buildings are in many cases of the double-fused types, and with new single-fusing fused type, or circuit breaker type of panelboards, it is now possible to increase the panelboard capacity in circuits practically 50%. Where the existing conduit feeder does not exceed 4/0 in size, it is possible to increase feeder capacity approximately 50%.

In many existing buildings installations have been designed and installed with 3-wire, single-phase services and 3-wire lighting and receptacle circuits. As the 4-wire 120/208-volt secondary network systems or isolated 3-phase banks and systems are installed, the existing installations are cut over or reconnected to this new type of service. This results in many conditions which are not favorable to the customer. The system within the building is no longer a 3-wire, single-phase system, but one operating on two phases and the grounded conductor of a three-phase, four-wire wye system. Where the services and circuits are loaded, which in old installations usually is the case, the voltage drop on existing three-wire feeders has increased approximately 57%. This results in a loss in wattage caused by the IR drop, and most important, a decided depreciation in existing illumination values. Under these conditions, the feeders and circuit wires and lighting panelboards should be changed to provide for a balanced system load and increased illumination values.

In existing installations, it is possible to make other wiring changes without marring or changing the structure or building with the introduction of fluorescent lighting systems. With fluorescent it was necessary to provide a raceway as part of the fixture

Under New Code Provisions

Harold Gerber
Consulting Engineer, San Francisco

for the enclosing of auxiliary equipment and the wiring to the lamp terminals.

New Code Provisions

Under the provisions of Art. 410, Sec. 4150 of the new 1947 edition of the National Electrical Code, where these fixture enclosures are also approved as raceways or where the fixtures are approved for end-to-end assembly and do not contain more than a single lighting circuit, it is now possible to pick up or connect to existing lighting outlets and extend along the surface of the ceiling using the fixture raceway as the means of the wiring extension systems.

In these older installations a 300-watt incandescent fixture can be replaced with two three-light, 40-watt fluorescent fixtures and the illumination values increased 250%.

One of the latest code changes is Sec. 2113 of the 1947 edition of the National Electrical Code entitled "Voltage." This permits lamp holders, when installed in industrial installations at elevations over 8 ft. above the ground and which do not have a switch as an integral part of the fixture to be installed on circuits where the voltage to ground does not exceed 300 volts. This new section will permit the installation of lighting circuits on 440 volts where the banks are wye connected resulting in voltages not exceeding 267 volts to ground. This new provision has many possibilities. Instant start fluorescent lamp fixtures and certain types of slimline lamps can now be made without autotransformer types of auxiliaries which must provide high-voltage starting values. It will permit the use of smaller conductors and raceways for heavy-duty circuits. For example, 15 amp. at 480 volts at single phase equals 7 kw. on a circuit of No. 12 wire and ½-in. conduit. It is needless to say more about the savings that may be made by using heavy-duty circuits at this voltage.

Today, because of increased illumination values, and the general increased use of electrical energy, the service and feeder requirements are increasing far beyond expected values for load increases. Use of new types of radiant heating systems requiring constant circulating pump loads, the increased installation of refrigerating and air conditioning equipment, elevator and escalator loads have resulted in loads of such value that the use of secondary services to installations of this type should be given very serious consideration before any such are made.

It is not uncommon to have installations where the secondary service supplied is in excess of 3,000 amp. These installations when so fed by the utility company result in a tremendous installation cost to the consumer, especially where high rupturing current values are obtained and it is necessary to properly cascade large and costly circuit breakers before safe and economical circuit interrupting capacity may be had. In serving these larger loads consideration should be given to the use of high-voltage feeder and unit substation installations.

Under new provisions of Sec. 2387 of the 1947 code, it is now permissible to install high-voltage conductors in rigid conduits or multiple-conductor cable approved for the purpose if the voltage does not exceed 15,000 volts. Previous limitations were 7,500 volts. If metal-enclosed switchgear is used, it may be installed without a vault enclosure. This will permit high-voltage load center installations in large commercial occupancies at distribution centers, eliminating long heavy secondary bus feeder systems, resulting in minimum voltage drop and maximum operating efficiencies. In large commercial installations it is now possible to install secondary network systems and tie-circuit conductors. This will permit loads to be shifted in position about the plant without changes in the secondary systems or will provide continuity of service upon failure of any interconnected transformer bank.

In many commercial installations, the existing services and feeders are overloaded from motors and other inductive type loads operating at low power factors. In many installations, changing service conductors and equipment is not only a costly installation, but might result in plant shut-downs during peak production periods. It is possible by installing fixed capacitor banks to improve the power factor and reduce the kva. values of the load to such an extent that additional load can then be added to the installation without changing services, or in many cases, feeder installations. Large secondary feeders can be treated in the same manner as circuit conductors.

In commercial and office building installations, occupying a limited ground area, but exceeding three stories in height, the use of low-impedance bus ducts for feeder requirements is becoming common practice. During past years it was customary to install radial feeder systems to one or more panelboards, which would limit the load of the feeder to that of the panelboard. This resulted in overloaded conditions which could not be changed without changing the electrical installation.

In installations of multiple-story buildings having wattage requirements above five watts per square foot, and in installations with smaller-wattage requirements, the use of low-impedance bus risers from basement levels to the attic machine room results in an economical and efficient installation. Where the panelboards are arranged to be stacked on each floor, one above the other, the panelboard is connected to the bus riser through an individual circuit breaker having an R.C. rating equal to the capacity of the feeder system. This riser bus not only supplies lighting and receptacle circuits but can extend to the attic space for elevator and air conditioning loads. The bus riser is installed for the total connected load and is usually the same size and rating throughout. Thus, loads may be shifted or used any place on the riser without affecting voltage drop conditions. The bus riser also is benefited by the demand factor for the total load.

In tall buildings in previous installations, bus risers required special installation features relative to support, transpositions, and expansion. It was necessary to hang the top section at the top of the shaft, support the bottom section from the base of the shaft and install flexible expansion fittings at the riser mid-point. New types of UL approved low impedance bus ducts are now manufactured, each section between floors supported within its own enclosure and having inherent facilities for compensating for expansion and contraction of the riser system.

No particular set of standards or rules may be used in planning the modernization of commercial installations. Each particular installation, with its specific use, structural conditions, and physical dimensions, presents a problem that should be carefully studied before any definite steps are taken in producing final plans. It is hoped this will result in greater benefits to the customer.

ELECTRICAL WEST

Election Promises

WHAT have the campaign speeches told the electrical industry about party intentions? Enough we believe, so that the industry can plot its future with some degree of foreknowledge, irrespective of the outcome of the election.

President Truman's stand for public ownership as defined by the New Deal was emphasized in his Oakland and other Far Western speeches. His vituperative attack on the light and power industry for its opposition to this program has been typical of his other campaign approaches to major issues. He derided the Congress and impugned the motives of some of its members. His position is clear and his arguments simply reiterate the misstatements that have kept the industry in the political stew for sixteen years.

Mr. Dewey's position as set forth in his Western speeches and more clearly defined in an interview aboard his special train, must shock some of the industry's conservatives. The New York governor favors public "main line" transmission of power generated at government projects. He has come out for the disputed TVA steam plant at New Johnsonville. He believes in regional multipurpose developments such as the Missouri Valley Authority. However, he favors administering such agencies at the local level. His position on natural resource conservation differs little from that of his opponent.

Politics being what it is, the industry can draw certain conclusions from these preelection declarations. Two strike us as particularly pertinent. (1) The need for a rationalized declaration of federal power policy is intensified. (2) Such a declaration must come from Congress and it is to that body that the industry should direct its efforts.

Priced Out of the Market

MAJOR fear of merchandising people today is that many items are going to be priced out of the market. Indications that this may be happening in a number of isolated instances are increasingly apparent. Those who set the rates for skilled labor should harbor similar fears. Those who must sell the skills of these people already know that trouble is ahead.

Here in the West the new rate for electricians is $2.50 per hour. Plumbers will shortly receive a similar wage. Apply both of these rates to the installation of such appliances as ranges, water heaters, dishwashers or automatic washers and the resultant charge to the customer puts these appliances now into the luxury class. We have heard of instances where installation charges were almost as great as the price of the appliance itself. Is it any wonder that customers balk and refuse to buy?

Labor should take cognizance of these trends. In its zeal for maximum earnings and maximum security, it too can price itself out of the market. What good then are high wages if there is no work?

Price Confusion

CONFUSION continues over the degree to which the steel industry's new f.o.b. mill pricing system and the Supreme Court's delivered price decisions will affect business on the West Coast. The electrical industry in this region can be seriously affected by the threat to many traditional pricing systems. The entire competitive position of various companies —national and regional—can be upset unless there is clarification of the decisions.

Electrical equipment, supplies and appliances have been sold in this region under a wide variety of pricing systems. Multiple basing point plans, zone prices, freight equalization plans, national uniform prices and f.o.b. factory prices have been in vogue, depending upon the product. The legal status of all of these, except the last, is now in question. And there is substantial disagreement among experts as to the meaning and implications of the recent decisions on any and all of these pricing systems.

As regards steel, the Far West will conceivably suffer just as long as the national demand exceeds the ability of the industry to produce. And this despite the fact that the steel-making capacity of the West has quadrupled since 1940. The region must import

EDITORIAL VIEWS

steel products and especially two items vitally important to the electrical industry—electric sheet and pipe. Here the pinch is tight.

Time and economics may take care of the steel situation. However, a lot of clarifying must be done before the confusion surrounding the general pricing situation is cut away. Congress is expected to do something about it. In the meantime Western business may suffer.

Who Mans the Outposts?

"SWITCHES were pulled in 98 Tokyo substations during the recent strike of a Communist-led electrical workers union in Japan." This item comes from McGraw-Hill's World News Tokyo editor. With no apparent letup of the international tension fostered by Russia in sight, the item should have significance in this country. We are mindful of an admonition voiced by California's Governor Warren. He said in effect that none but tried and trusted Americans should man the outposts. This warning should apply particularly to the country's electric utilities. Their importance to the very life of the people and their vulnerability to sabotage make them attractive targets for any fifth column.

Found Little to Change

TO anyone who has attended inspectors' conventions for several years the three annual section meetings in Denver, Salt Lake City and Oakland last month were surprisingly free of argument and lacking in strong demands for changes in the National Electrical Code. Only details were suggested to need change, nothing basic. This probably means that the big issues of the past, such as bare neutral, concentric wiring and grounding have been pretty well solved.

This lack of issues is encouraging to the ideal of a universally acceptable code for the country and subsequent reduction in desire for special local rules or restrictions. As the code covers a few still incomplete areas that need unification and definite requirements, it will become still more a National Electrical Code in fact as well as in slogan. Some of the still-needed coverages are in push-button wiring, radiant electric heat installation, emergency lighting for all places of public assembly and a unity with others involved in hospital operating room explosion hazard removal.

There is a new procedure for code making now, and the West—San Francisco, next May—will have the first national gathering of the new NFPA Electrical Section. It will be an appropriate time and place in which to consider these needed additions to the code.

WHY is the public so unfriendly to the businessman? In the businessman's characteristics are some clues to his historical unpopularity. The businessman as a type has traditionally been individualistic, taciturn, colorless, cautious, puritanic, orderly, hard-working and thrifty. In other words, a bore. He has traditionally sided with no one, so he lacks traditional friends. He lacks the ability to get a popular grip like the men of the state, church, art, science or justice are able to get on the populace. He has seldom been a patron of the art. So great painters, sculptors, writers and composers have not glorified his work in picture and song for the people to admire through the centuries . . . The deeds and policies of business may be right, but it is losing the fight for public opinion by ineptitude and default. It has a better product but it is being outsold. It is not educating the public in basic business economics, which only it can do. For business alone has the facts . . . The dangerous misconceptions in the worker and public mind have been spotted. But they are not being corrected. Yet it has been shown that proper education by companies quickly brings about improved cooperation, understanding and efficiency. For it is axiomatic that when you give the American people the facts, they make sound conclusions and act fairly.—Henry Von Morpurgo, Henry Von Morpurgo & Company.

Crowds were constant around the television cameras set up at the San Diego electrical show by KFMB-TV. Twenty receivers in the booths of exhibitors were piped to these cameras. All show events were televised and, in between, the cameras "panned" the crowd, letting each visitor see for himself in the projection-type receiver behind camera

Crowds Swamp Eleventh San Diego Show

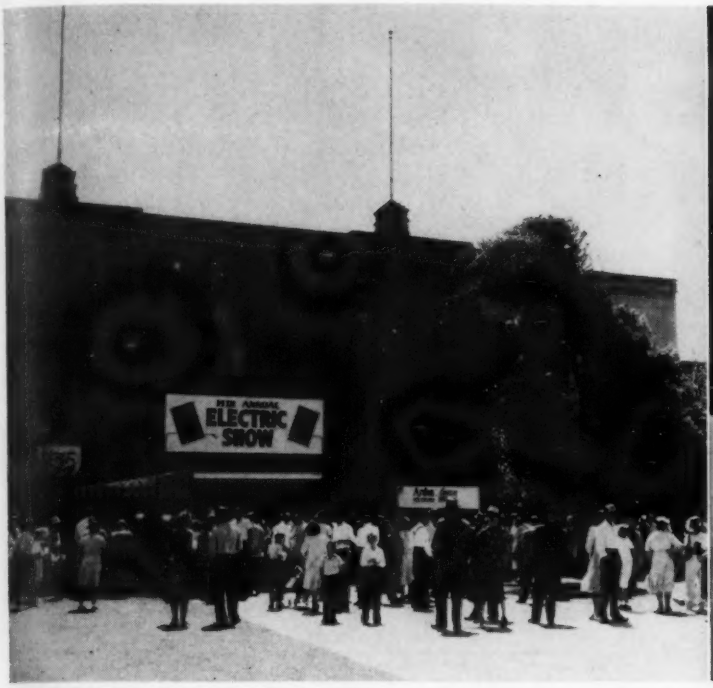
The electrical industry of San Diego County did it again.

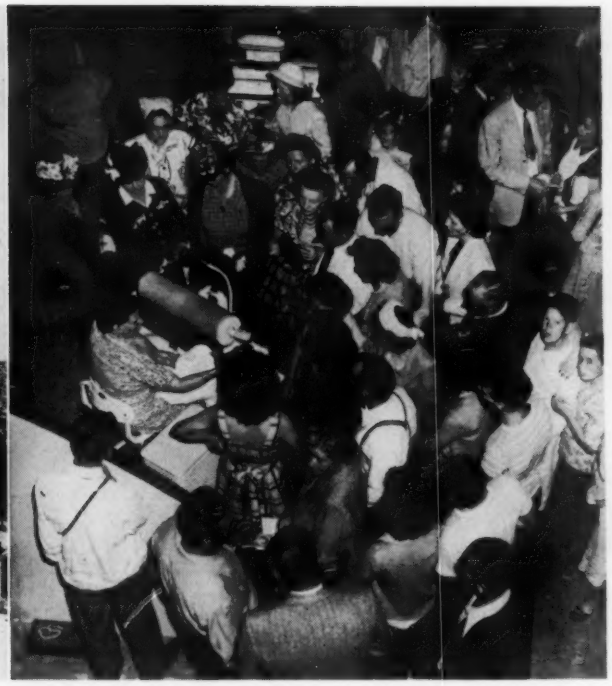
When a straight electrical appliance show, produced by the industry without professional assistance, draws one-third of the total population of the county—well, it must have been successful. By closing time, Sunday, Sept. 19, more than 140,000 men, women and children had made their way out to the Federal Building in San Diego's Balboa Park to attend the 11th annual Electrical & Home Appliance Show sponsored by the Bureau of Radio & Electrical Appliances of San Diego County. Many thousands more started from their homes but were discouraged by the several handicaps that have plagued the industry there during the two years that it has been necessary to hold the show in the almost inaccessible and inadequate building in the center of the park. Auto traffic jams, sometimes a mile long in tie-up, plus the necessity of walking over a mile to the nearest street car and bus lines, definitely kept the attendance from reaching an even larger percentage of the area's population.

But the 140,000 that did witness the displays of more than 100 electrical products in the booths of 50 distributors and manufacturers taxed the building's facilities, and strained the selling stamina of the dealer crews that took turns in manning the booths. And it was a buying crowd. Several thousands of dollars in direct sales were made on the floor, and every dealer developed hot leads that would keep him and his sales force busy for weeks in follow-up. Investigation showed that the show was under way only a day when dealers in every section of the county reported sales made to people that had become interested in the product during their visit to the show. An unofficial estimate of the sales stimulus created by the San Diego industry's electrical show is that nearly one-million dollars in *extra* appliance business for the dealers was created.

Outstanding feature was television. At a time when there was no local television—certain high locations in San Diego get good reception from the distant Los Angeles stations—but with the first San Diego station scheduled for the first of the year, the pent-up ambitions of the people to see good television through home-type receivers was satisfied by the heroic efforts of the coming station and the Electronics Division of the bureau. Seventy-two hours before the opening of the show, the television cameras and allied equipment arrived in San Diego by air. Night and day efforts by the staff of KFMB-TV, the manufacturer's engineers, and the electronics division men, enabled the station to get set up on the floor of the show with coaxial cables to receivers in distributors' booths. More than 20 television receivers were in operation at all times, presenting an almost perfect reproduction of the scene being televised by the cameras in the front of the floor. Industry opinion gave the station, and the men who assisted, credit for the best boost television had ever received in that area.

For the first four days, the camera-





Crowds waited each day for the 1 p.m. opening. Many more than the above are waiting in the shade of other groups of trees. All had braved traffic jams or long walks from street car lines. Crowds looked, listened and bought. Appliance demonstrations like that at the right were still popular, still most effective draw for an exhibitor

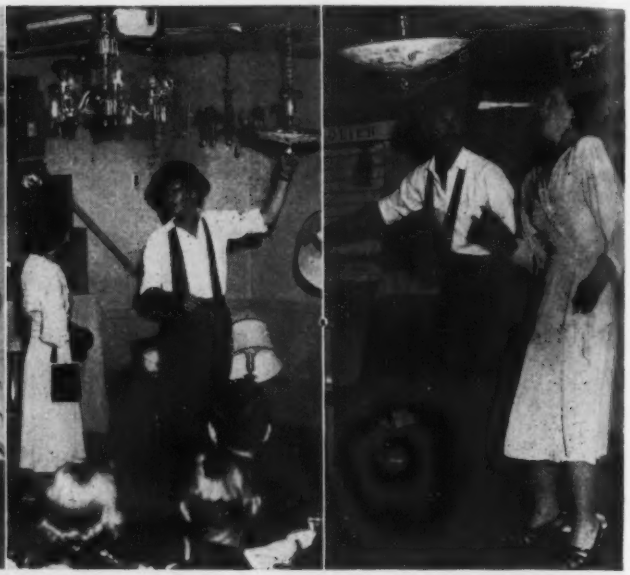
men televised the stage presentations, the awarding of prizes, and other events, with good success. Then they started toying with the cameras, panning the crowd. From that moment, television took over the show. In effort to be televised and to look at their own image on a television receiver a few feet behind the cameras, at least one half of the show attendance grouped in front of the cameras, often blocking the area. Only complaint came from the dealers and salesmen in the booths who felt they were losing sales.

Managing the 11th San Diego show was a committee consisting of O. G. Thompson, Bob Redfield, Gene Cramer, Lee Borstein, E. W. Meise, and Bill Durning, with the association's secretary - manager, the seemingly-tireless J. Clark Chamberlain, in direct charge of its organization and operation.

Crowds won prizes at the twice-a-day presentation of about one dozen small appliances to holders of lucky door tickets (top, right). On stage, left to right, "Boots" Bouton, G-E Supply's O. G. Thompson, Association Manager Clark Chamberlain and Chamberlain's grandson drawing the tickets

Crowds were entertained at the twice-a-day feature show with local amateur and professional entertainers. Show was televised to receivers in each booth

"Well, whatta you got in mind? A good one or a cheap one?" "Our new dining room set is expensive. I'd prefer something in keeping." "Uh huh. How about this one?" "Is that what they're using now?" "Sure, it's $37.50"

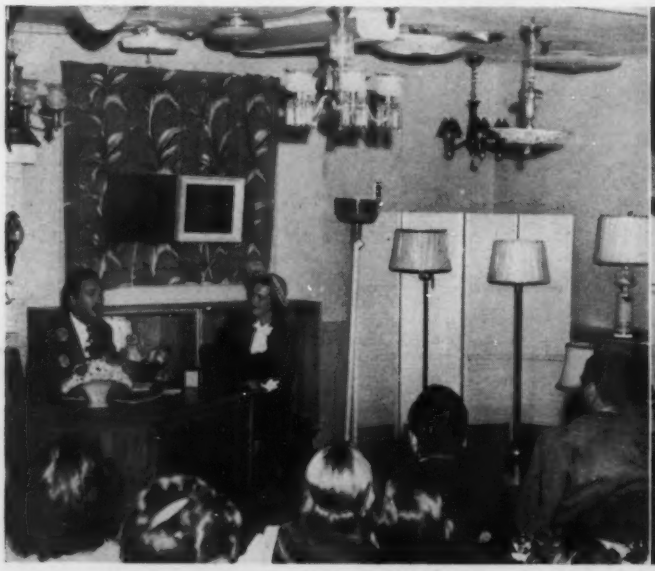


"Goodness, that's too high. Here's one that's rather intriguing." "That's ok. Looks real nice when you light it up. (Pulls on chain, nothing happens, yanks it again and fixture falls to the floor.) Huh. I musta had it on too well"

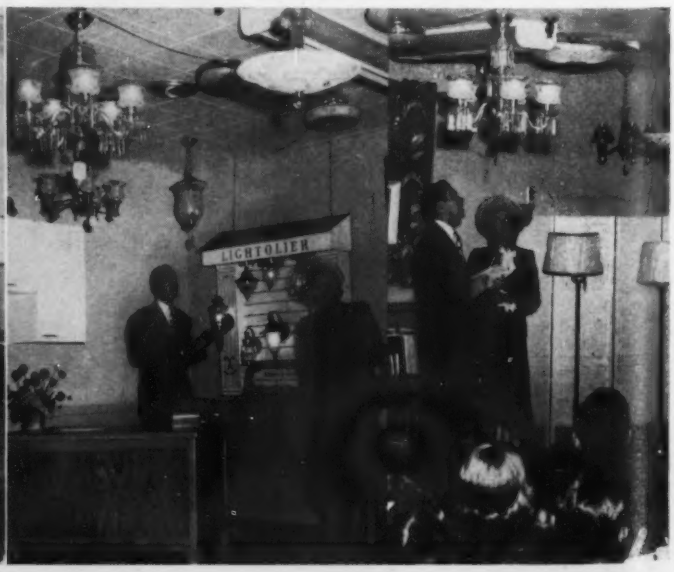
LIGHT "California Becomes Electra" Shows

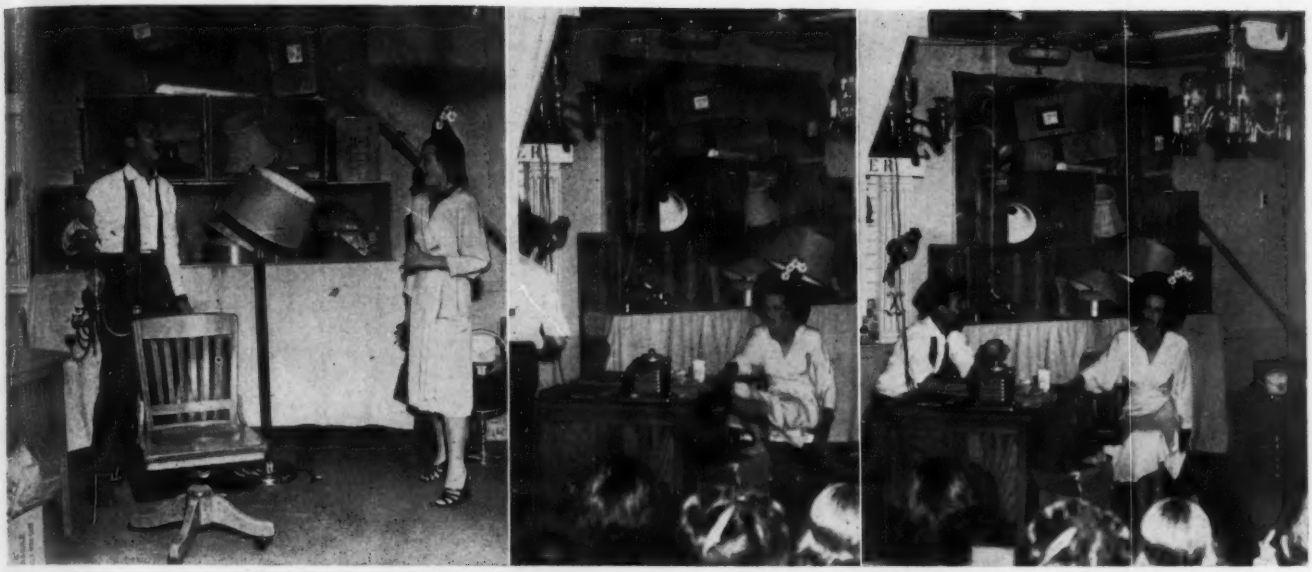
That there is profit opportunity for electrical contractors and dealers in quality electric fixtures for the home was proved to about 150 who attended the opening of the California Electric Supply Co., San Francisco, completely modernized fixture display rooms last month. Not only did they find beautiful displays arranged by types of room, each fixture individually controlled by its own Touch-Plate relay from push-button panels, but they were treated to a clever skit at dinner which dramatized the wrong and the right ways to sell home fixtures. Nat Blumberg of Lightolier Inc. who has seen plenty of both, and Rolf Stoddard, promotion manager for California Electric Supply, provided the basic script, which Monty Masters, radio actor, polished and acted with his wife Natalie. First scene, shown above, was in a run down, cluttered, untidy dealer's showroom. The customer had to thread her way through cartons, dusty lamps and dangling fixtures to an untidy desk.

"Our house will be a ranch-type home, redwood and white stucco." "Sounds very attractive. Let's see now, you know a woman spends about half her day in the kitchen. Let us talk about that first, shall we?" "Fine!"



"Suppose we start the 'grand tour.' May I call your attention first to this coach lantern for the ranch exterior—" "Is crystal still in style?" "Crystal fixtures are like your sterling silver, Mrs. Masters, they'll never go out of style—"



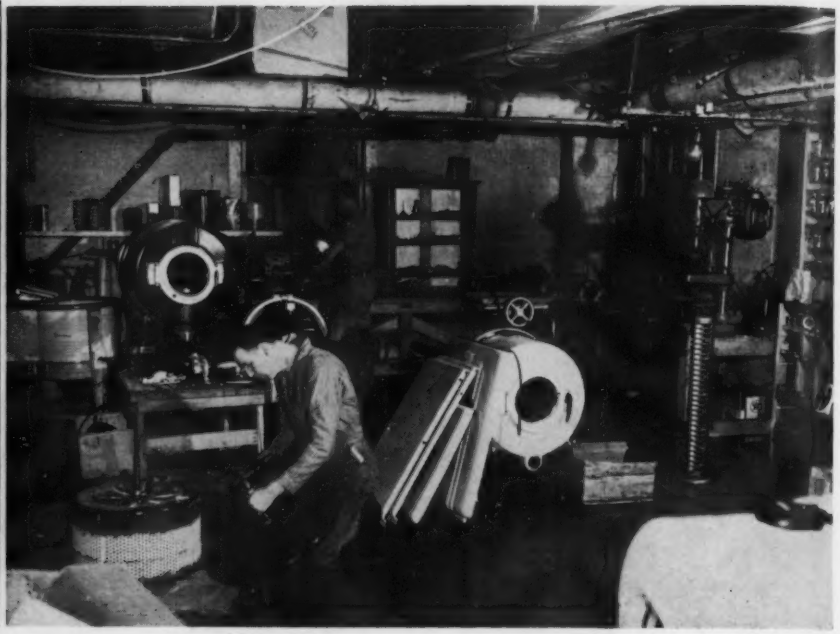


"This one is a little killer." "Well, it's not bad." (She bumps into a lamp, runs finger over it, sees dust.) "Are your fixtures all new?" "Oh, absolutely ma'm." (He suddenly sneezes on floor lamp and blows up cloud of dust.) "Got to look at my catalog. Sit down." (While he thumbs through dog-eared catalog she sits, chair almost overturns.) "Say, I heard a funny story—" "I don't think I care to hear it." (While he's busy she slips out the door.)

Dealers Wrong and Right Selling Methods FIX

When she sat on the chair it almost turned over, lacking a caster. After many attempts to buy she slipped out, disgusted, while the inept dealer hunted for a catalog. In the second scene, pictured below, the woman entered an attractive showroom, was treated courteously, her particular wants asked for, she was shown quality fixtures suitable to each room, the dealer skillfully listed suggested fixtures for every room and porch. And he knows how to close the sale, even though the total seemed high, by overbalancing pride with the elegant appearance, fine quality, long service and sound investment in the fixtures selected. The "fixture allowance" of $125 faded out before a $376.50 order for the house and he sold them so well she asked him to be sure to drop in and see them after they were installed. Dealers and their wives who attended saw themselves in many of the situations, laughed, and took home a new incentive to sell up. After the show all were shown the new display rooms.

"My goodness, what are these darling things?" "They are the last word in lighting perfection for reading in bed." "I wonder if you'd do me a favor. You know what my problem is. Include the fixtures you think those rooms should have and tell me what the total cost is. You should know." "Your furnishings are in extremely good taste. To cut down on the quality of your lighting fixtures is like putting a juke box in your living room." "Yes, yes, I agree"



Modern new shopping center of Garrett Appliance Co., Springfield, Ore., just three miles away from Garrett's main store in Eugene. This 36 x 80-ft. building will be a selling store, with service and delivery handled out of Eugene. Service departments at Garrett Appliance Co., Eugene (right) provide ample working space for specialized servicemen. In the rear, G. H. Long is turning out a special replacement part. In foreground is C. M. Jayne

HOW YOUR SERVICE CAN SELL

Garrett Appliance Co., Eugene, Ore., has a money-making plan for its service departments and makes them a reason for doing all appliance business with it

TAKE a reliable and efficient service department, keep it on good terms with the public, and you'll have an idea how Garrett Appliance Co., Eugene, Ore., operates, and you'll also have an example of service that sells.

W. S. Garrett's aim is to promote dealer and customer good will, both in sales and service. "Our service departments will be what we make them," says A. C. Stockstad of Garrett's, and Garrett's chooses to make its departments profitable. This appliance business goes on the theory that intelligent advertising is one important way to produce profits directly for the service department. An example of the store's advertising was a promotion in a local newspaper keyed to inform the public what to look for when buying electrical appliances. In a series of four advertisements Garrett's emphasized buying only nationally accepted brands, buying only from a dependable dealer, and buying only from a dealer who has complete service and repair facilities.

Out of its Eugene store Garrett's handles service and delivery. Three miles away in Springfield, Ore., Garrett's has just built a modern new selling store, complete with a model kitchen and carrying a full line of electrical appliances.

For several years Garrett's was the only place in Eugene where every type of appliance could be repaired. During the war years the store operated as an appliance repair center. The public appreciated that service and they learned to pay for it, says Stockstad. The problem now is to keep the service department profitable during a period of normal market conditions, and Stockstad has a plan to do just that.

The store has all the necessary equipment to handle any repair job, so there is no risk of turning any business away. Stockstad believes that a job turned away is not just the loss of a customer but the loss of a person who might bring in more repair work and might be a prospect for the sale of new appliances.

Garrett's employs only trained servicemen, because the store claims a specialist can do a given repair job better in less time, charge the customer less, and produce more profit for the store.

There is plenty of space in Garrett's service departments. The various departments are segregated so that each serviceman has ample room to work, and can do his job quickly and efficiently.

Garrett's maintains an adequate inventory of parts in its service departments. An appliance dealer should make profit from every part he sells, and should adjust his markup to see that there is profit above the cost of stocking and handling the parts, says W. S. Garrett, the owner.

The store has a cost control system with records to show the value and profit from all work done, not only that done for outside customers. With this type of cost control system, Garrett's is able to get a clear idea how much profit its service departments are making.

This efficient system makes friends, makes customers and makes money for Garrett's service departments.

Co.,
cial-
t a
yne

L

erv-
s a
job
cus-
rofit

ett's
de-
each
ork.
effi-

in-
part-
ould
ells.
see
t of
says

tem
and
only
With
Gar-
how
ents

nds.
for

ELECTRICAL WEST Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

October 1948 ©

Virus X

Although many griped over the days of shortages, as the days of surplus begin, a plague of new insects appear to sting the appliance business—the cut-price brokers, operating out of a telephone number, making back-door deals with some who shouldn't have franchises but do, advertising wholesale prices on any make of appliance to the public. Without stock or warehouses, guaranteeing no service, these ex-black-marketeers even have the nerve to tell phone inquirers to go see and pick the type and kind of appliance they want by wasting a dealer's time, then call back and make the deal with them. Don't blame manufacturers. They want this stopped too. Help them track down the broker and his dealer stooge so that appropriate franchise action can be taken. Cure for this evil calls for good industry teamwork, not gripes.

Rushing through

Television may start in the San Francisco region in November. Equipment was flown from RCA at Camden to KPIX-KSFO for installation on top of the Mark Hopkins. Patterns may go on the air in November and regular broadcasts in December to help the radio trade sell sets for Christmas.

Big ideas

The ideas of everybody as to what their talent is worth certainly hits the stratosphere when television comes. Salt Lake City's station KDYL wanted to videocast University of Utah football games. The University set so high a price nobody could sponsor it to reach the relatively few sets in use. Intermountain Electrical Assn. finally convinced the U that it needed to help TV get started before it could pay any such fancy prices. Everybody must give some in order to breed a goose that will lay a few golden eggs for dealers, distributors, manufacturers, stations and sponsors.

Radio drive

National Radio Week, Nov. 14-20, will get strong local promotion in Salt Lake City region by the Intermountain Electrical Assn., and in Los Angeles area by Southern California Radio & Electrical Appliance Assn. With promotion themes, "Radio in Every Room" and "Radio for Everyone" and a tie-in radio script contest among high school students for a "Voice of Democracy" radio program, the Radio Manufacturers Assn., National Assn. of Broadcasters, National Electrical Wholesalers Assn. are implementing the promotion with literature, advertising and promotion materials.

Moves

With the retirement of Fred Todt, manager, G-E Supply, Los Angeles, due soon, Harry Gerster, Seattle manager has been moved to Los Angeles and W. P. Gullander, from Bridgeport head office, has been sent to Seattle.

Cogent remarks on the appliance outlook were voiced by Marshall O. Crowley, vice-president of General Electric Credit Corp., on a recent trip to San Francisco. Crowley met with Harry P. Gough, Western district manager of G-E Credit Corp., and other personnel of the firm. Said Crowley: "In the approaching competitive market it is the appliance dealer without prewar experience who will feel the pinch. . . G-E is doing all it can in training dealers and salesmen to meet the competitive market by teaching them sound business procedures. . . Effect on new regulation depends on how fast supply catches up with demand; new rules will probably have some effect on overall appliance sales. . . G-E business on West Coast has increased greatly over prewar times; sales clearly on increase now." | Competition ahead

Active Los Angeles Department of Water & Power has started a big fall electric water heater campaign. Is using a series of lively cartoons in local newspapers; one straight ad to inform the public of the department's allowance for installing water heaters. Campaign is backed up with ads directed to the trade. | Program of ads

News in the refrigerator industry is Deepfreeze's acquisition of the Frostair Duplex Refrigerator line from General Tire and Rubber Co. Existing Frostair distributors will keep their franchises; territories not covered will be open to Deepfreeze distributors. | Takes over

Ray J. Noel, Los Angeles, will be a sales representative for the new firm Amplex Corp., Brooklyn, N. Y., makers of light globes and lighting accessories. His territory covers California, Arizona, Nevada and the Hawaiian Islands. | Light rep.

Electromaster Inc. has upped prices about 5.2% on its line of electric ranges. Vice-president Gerald Hulett says wage increases, jump in price of steel and wire, boost in freight rates are main factors in price adjustment. | Spiral

Six promotional and educational aids to supplement the Planned Lighting Program of the electrical industry are available now from Edison Electric Institute and Better Light Better Sight Bureau, joint sponsors of the program. New materials include the folders "Lighting Ideas to Brighten Your Home," "How to Make Homework Lighter," Planning Your Sunshine Home with Lighting for Better Living," in addition to a series of three mailing pieces on planned lighting for food stores. | Six helps

Highlight of Frigidaire's commercial refrigeration and air conditioning sales training this season is a new year-around program which will attract more than 1,000 field representatives and commercial dealers to Dayton, Ohio. | Year 'round

Dexter Co. is offering its dealers a new plex-o-glass washer for demonstration purposes. Transparent twin tubs dramatize double sudsing method now being featured in Dexter advertising. | See the wash

Hay fever victims will be interested in the new room conditioner by Fresh'nd-Aire Co. Unit operates on a waterfall action principle—cleans, filters and washes air. Removes pollen as well as dust and smoke. Approved by Underwriters' Laboratories. | No sneezes

"Guide for the Selection of Sales Supervisors" has been put out by Edison Electric Institute, 420 Lexington Ave., New York. Outlines suggested procedures for helping executives choose salesmen. Available at EEI. Price is 75 cents. | EEI manual

NERA stages its first big regional meeting in the West, Oct. 25-26, at Rodger Young Auditorium, Los Angeles. Called NERA Leadership and Business Convention, its managing director, Clif C. Simpson, Chicago, will be there, perhaps Herb Names, Denver dealer will attend also, although he has just opened a new store and feels the need to direct operations for awhile at home. Phil Urner, Urners', Bakersfield, a national director, is heading arrangements, with Elmer Weinheimer, field director.

Big confab

First day's program will be for dealers only, and have panel discussions on improving franchises, fair trade pricing, violations, backdoor and discount selling to employee groups, coops, builder and multiple purchase sales, business efficiency. Leslie Hoffman, president, Hoffman Radio Corp. and Wm. Cranston, president, Thermador, will address two luncheon meetings. The second day's afternoon session will be a joint industry conference with manufacturers and wholesalers to discuss mutual aspects of dealer problems.

Program plan

Certified lamp campaigns are being conducted in the Rocky Mountain region, by the Public Service Co. of Colorado in Denver and its territory in cooperation with dealers; and by Utah Power & Light Co. and Intermountain Electrical Assn. and Western Colorado Power Co. in eastern Idaho, Utah and western Colorado. Sacramento is also organizing a certified lamp campaign for and with dealers.

CL promotions

Deservedly J. Clark Chamberlain, manager, Bureau of Radio & Electrical Appliances of San Diego County, has been elected president of the International Assn. of Electrical Leagues, the organization and clearing house for managers of these promotional associations. Ralph B. Hubbard, manager, Rocky Mountain Electrical League, Denver, and Carlos W. Stone, manager, Intermountain Electrical Assn., Salt Lake City, were named directors. It is possible the next annual meeting may be in southern California.

Heads leagues

Duplicating radio-television sets that repeat the image in another room of the master set to which they are attached are being readied for market soon by Olympic Radio & Television Inc.

Repeaters

Curtis Publishing Co., surveying its readers and manufacturers, estimates that 2,800,000 home dryers can be sold in the next six years, some 500,000 a year. Urban areas offer greater volume at first, and more prosperous families are the first market because of present price.

Dryer market

Sales training classes are to be resumed by the Intermountain Electrical Assn. in its various chapters. San Diego Bureau of Radio & Electrical Appliances has a unique business management series of classes going on as well as the ABC's of Selling. Northern California Electrical Bureau has an advanced course ready to follow up its successful spring fundamental course.

M. Stuart Brecka will work out of the Seattle office of General Electric Co. as sales representative of the Pacific District for G-E heating devices, fans, clocks and products of the sunlamp and heater section, announced B. M. Tassie, district manager of appliance sales.

G-E rep.

Sunbeam has added two new features to its Mixmaster, an automatic juice extractor, and automatic bowl-speed control--nylon button at lower end of outside beater keeps speed uniform.

Improvements

Lightolier's big advertising campaign this year will be centered around Decoralite—"light pictures" - hangs like a picture, plugs in like a lamp. Promotion will include full-page ads in consumer as well as trade magazines and dealer helps. — A cross between

Webster-Chicago Corp. is launching its fall advertising campaign this month using newspapers and national publications to promote its "electronic memory" wire recorder. Dealer support will include window streamers, counter cards, and promotional literature. . . Webster-Chicago has introduced two new dual speed, dual groove automatic record changers, both providing automatic or manual play of standard or long play microgroove records at 78 or 33 1/3 rpm. Both changers feature the Tilt-O-Matic tone arm and pickup cartridge with Tandem Tip needle. — October promotion

Neat tool to promote the sale of electrical appliances is the display clip "Maggie" —a product of Magnetic Merchandising Inc., New York. Magnetic clip holds a 5 x 8" card; adheres to steel surfaces, even those covered with enamel. Norge Division of Borg-Warner, Hotpoint and Chicago Electric Mfg. Co. will be using "Maggies" to highlight features of their products. — It attracts

Improved features on the Sunbeam Coffeemaster include a matching handle on the upper vessel, making it easier to remove top and prevent vessel from rolling when placed on a flat surface; also new seat ring with stainless steel inner-spring, forming a tighter seal between upper and lower vessels. — Two additions

G-E offers a new edgelight identification sign for counter and window displays to its retailers. Etched glass sign has the word "appliances" featured in white scroll letters beneath an orange monogram. On the bottom are written the words, "Appliances Most Women Want Most." Sign is lighted by two 25-watt lamps. — Bright sign

Double-duty iron called the Swifty is a product of Eastern Metal Products Co. Weighs only 2 3/4 lbs. Comes in a flameproof travel case. Retail price is $7.95 plus cost of case. — Nifty

Electric water heaters have been added to Wayne Home Equipment Co.'s line. First deliveries were scheduled to start last month. Company will manufacture both conventional round and table-top models. — New line

Hamilton automatic clothes dryers are now equipped with an ultra-violet sanitizing light; gives the clothes a germicidal treatment while they dry; lamp also gives off a type of ultra-violet radiation which creates ozone--so clothes have "fresh air" smell. — Extra clean

Clark Division of McGraw Electric Co. has published a booklet entitled "Guide to Economical Water Heating" which discusses advantages and disadvantages of all types of water heaters; also offers suggestions for improving outmoded hot water systems. — Guide

Hotpoint has originated a home freezer promotional program in which appliance dealers serve as hosts at consumer "food freezing parties." Dealer provides the foods, packaging materials and facilities for preparation, packaging and freezing of the foods and invites homemakers in the community to attend the party and participate in the actual process. Estimated cost to the dealer is 20 cents per guest. This home freezer plan promotes sales on an educational basis, says Hotpoint. — Freezing parties

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © OCTOBER 1948

LAMPS, ACTION, SALES is the sequence of commands for the salesman in selling lamps. And what better time to get into the swing of selling Certified Lamps than right now! Summer season is waning, fall is here, and with it the dark season. The customer will be in a buying mood for lamps. Make the most of the lamp demand.

Explain the benefits of Certified Lamps. Many customers don't know the meaning of Certified Lamp. It's up to you to explain to the prospect just what she is getting when she buys a Certified Lamp.

Here's a little sales scheme we've worked out to help you give the customer a good pitch on Certified Lamps. Remember the word CERTIFIED.

CERTIFIED—means lamps that are endorsed by lamp manufacturers. They are "approved standards" lamps.

EFFICIENT—because Certified Lamps are carefully tested. No need to worry about cord repair and switch troubles right off the bat.

RESTFUL—to the eyes. Certified Lamps are designed to give maximum light, eliminating glare and shadows.

TESTED—lamps mean safety in the household. Certified Lamps are tested, certified and advertised.

IMPERATIVE—for studying. With school in session, children need good light to do their homework. No worry of eyestrain with Certified Lamps.

FLATTERING—to the room. Certified Lamps brighten the home, add cheer and color.

IMPORTANT—to good health. Certified Lamps make it easier to sit up straight when studying or reading, thus preserving good posture.

ECONOMICAL—because Certified Lamps prevent needless accidents in the home caused by inadequate lighting.

DESIGNED—to give adequate light and be in harmony with the room.

Electrical West—Vol. 101, No. 4

To be financially successful

Use Good Senses

Advises

Ken Hampton

Human senses are an open door through which good retail stores work effectively toward the signed order. Frank appeal to the senses of smelling, tasting, seeing, feeling and hearing must play an enormous part in a store's merchandising program.

It guides display work, both in the windows and inside the store. Most appealing of all displays are those having action. Next in effectiveness comes the use of color, particularly in its proper relation to light.

The sense of sight is very important in selling because most people cannot visualize well. When an electric stove is displayed it should be shown with cooking utensils on it and display models of food in its oven.

Frozen food chests are mighty dull items until filled with a colorful variety of packaged food. The same is true of refrigerators, etc.

Operating washing machines and ironers always attract attention and interest. It is simple for any retail appliance store to arrange to put in use a toaster and coffee maker. The small cost and effort involved will increase sales several times over.

Second to the importance of sight probably is the sense of touch. Many an automobile has been purchased simply because a good salesman encouraged the customer to get behind the wheel and drive it. A prospect for a vacuum cleaner should always be asked to use it. Many times a demonstration in the home is required to get the order.

When selling a flatiron, the sales person should get it into the customer's hand as soon as possible so she can feel its fine balance, inspect its beautiful finish and visualize herself using it. The same is true of electric bed coverings, all items of tableware, etc.

Radios and ironing machines offer another opportunity for the salesman to have the customer operate the appliance being shown.

The smell of food cooking is in itself attention getting; tasting it is an important part of the procedure of impressing prospects for cooking appliances.

Right now when competition is beginning to show up poor sales training and the inadequacy of dealer sales staffs, retail appliance dealers should seriously consider the possibility of employing women demonstrators to work in their stores at peak hours.

These demonstrators can help by

(1) attracting attention to the appliance being used,

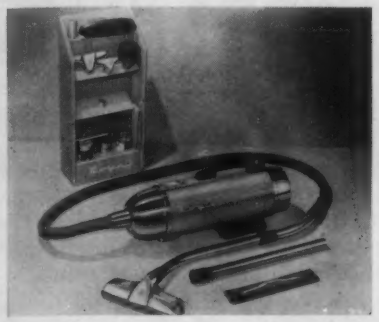
(2) Arousing interest in the appliance on the part of the customer,

(3) Either making a complete sales presentation or holding the customer's attention until a salesman is available to close the sale.

Action displays and store demonstrations have an appeal that few people can resist. They represent attention-getting ideas that will be widely employed this year by wise appliance dealers who are out to move appliances that are in supply and put profit on the books.

APPLIANCE PREVIEW

Vacuum Cleaner (1042)



The Royal Model 260 vacuum cleaner has a new power unit claimed to develop high suction, to run quietly and smoothly. The swivel floor nozzle is new and operates in combination with a floating brush. All hose and tool connections are said to be airtight. Connection of hose to cleaner is a three-prong type. Two-section wand is said to be light and easy to use. A filter traps fine dust. Finger touch clamps are provided for removal of dust receptacle. Comes in red baked enamel; is 23¾ in. long, 7 in. wide, 9⅝ in high.

Motor is horizontal type, operates on a-c or d-c, is mounted in rubber. Estimated life of motor brushes is 800 hours, ⅝ hp. Fans are dual type, made of aluminum, 4-15/16 in. diameter, individually balanced. Has radio interference eliminator; 18-ft. cord; dust receptacle has approximately 190 sq. in. filtering surface.

The Royal 238 is a cylinder cleaner designed for homes or apartments where storage space is limited. Has many of the features of the 260; is 19 in. long 6¾ in. wide, 7 ⅝ in. high.

Reflector (1043)

Lytemaster, a reflector designed by Lightolier, fits any floor or table lamp with standard-size socket holders. A prismatic clear glass lens forms the bottom of this reflector, directing light downward for close work. Sides are of ribbed enamel glass to deflect extra light upward. Up lighting is spread by a vertical light control. Outside wall is designed to permit only enough light through to "warm" the shade. Comes in two types, one for floor and one for table and bridge lamps.

Touch-Type Control (1044)

A braille, or touch-type, control switch for the 1948 Westinghouse warming pad comes in a streamlined black plastic case fitting the palm of the hand. A knurled dial carries the visual markings for off, low medium and high. In addition small metal dots appear as the dial is moved from setting to setting. One dot is for low, two for medium and three for high. All dots disappear on the off setting. Warming pad comes in pink or blue.

Low-Boy Refrigerator (1045)

Acme-National Refrigeration Co. will offer a new model Freeze-O-Matic Jr., a Formica-top low-boy refrigerator. The new model is 36 in. high, 24 in. wide, 22½ in. deep; weighs 160 lb. Cabinet is of heavy-gage steel, vapor sealed; has full-length door and kick plate. The Tecums condensing equipment is a ⅓-hp. hermetically sealed unit.

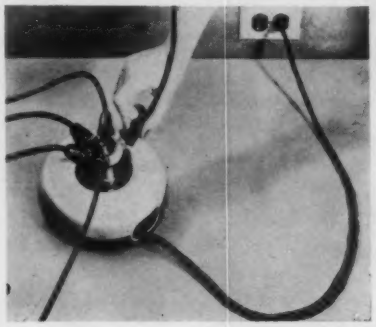
Radio Alarm Clock (1046)

Haydon Mfg. Co. has added a radio alarm clock to its line of timing motor devices. It is a combination clock and control for mounting in radio panels; has hour, minute and sweep-type second hand; 3-position switch for "on," "off," and "on" at preselected time. The manufacturer states that the clock may be mounted in any position; that no shielding is required to prevent interference with radio reception.

Spiral Lamp (1047)

Certified Electric Corp. is offering the Spiralamp, designed to take advantage of the light developed in the inside surface of the phosphor. This lamp exposes the helical area of greater brilliance in a decorative motif.

Multiple Outlet Reel (1048)



The Cordomatic multiple outlet reel is an automatic adjustable-length extension cord giving 10- and 20-ft. extensions. The cone-shaped multiple outlet mounted on top of the reel is a continuous groove receptacle accommodating six or more plugs depending on size. A ratchet arrangement permits extension of the desired length of cord between the electrical outlet and the reel. When not in use, the cord automatically winds back on the reel. This product is manufactured by the Vacuum Cleaner Corp. of America.

Automatic Defroster (1049)

Paragon Electric Co. has announced the "de-frost-it", a device to convert any home electric refrigerator to an automatic nightly defrosting unit. The refrigerator cord plugs into the device, which is plugged into a convenience outlet. A "skip-defrost" feature interrupts the defrosting cycle if desired.

In operation, the device interrupts the circuit to the refrigerator just long enough to allow the daily accumulation of frost to melt. Refrigerator temperature is not raised excessively, according to the manufacturer, and as a general rule will not exceed the differential setting of the refrigerator thermostat. Underwriters' approved, the unit is finished in white enamel, is 2½x2¼x5½ in.

Reel (1050)

Eypper & Co. is manufacturing a Bakelite reel to take care of excess wire on lamps and electrical appliances.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

1042 1043 1044 1045 1046 1047 1048 1049 1050

Name ..... Company* ..... Title* ....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Bullock

New Money, New Men Wanted

RMEL Glenwood Convention Told

TWO thoughts threaded through all talks at the Rocky Mountain Electrical League's 45th annual convention, held at Glenwood Springs, Colo., Sept. 12-15, and presided over by James A. Bullock, vice-president and general manager, Western Colorado Power Co., RMEL president. George M. Gadsby, president, Utah Power & Light Co., Salt Lake City, enunciated both thoughts in his opening address and other speakers carried the theme throughout the convention.

These thoughts were: (1) the industry, in its need for money to finance demanded new construction, will need rate increases; (2) the industry is failing to attract into it the young college graduates it will need to pick up the administration in years to come.

With a six billion dollar construction program through 1952 and capital costs increasing in relation to operating costs (a power plant built in 1936 cost $83 per kw.; another at the same site this year will cost $180), it becomes increasingly important to study location of new capacity with reference to load, transmission costs, losses vs. high land cost and taxes. Before money can be hired, it must see where its wages and retirement pay are coming from, said Gadsby. This may necessitate rate increases. Gadsby cited several industries which have had to increase rates and have told the public of their needs.

From this thought he turned to the industry's need for additional trained personnel, quoting the Chinese proverb, "If you are planning for one year, sow grain. If you are planning for ten years, plant trees. But when you are planning for a hundred years, grow men." The question of competent manpower for administration has a marked effect on the ability to attract investment money. He urged that the industry start now to recruit, train and hold thousands of the most promising graduates of the nation's colleges. The future of the industry is as inspiring and glamorous as ever in its history.

Telling of the survey to forecast power needs in the next ten years, Thomas Fort, central station manager, Westinghouse Electric Corp., East Pittsburgh, echoed the same themes. The residential kwh. increase from last year's 1,438 to 2,100 by 1957 will come from television, germicidal lamps and other new developments. Farmers will increase the horsepower per worker. Small business and industry, heavy industry and governmental uses will raise the generating capacity need from 1947's 256 billion kw. to 430 billion for 1957. He predicted shifting emphasis from generation to distribution and told of the experimental 500-kv. line at Brilliant, Ohio. It was then that he re-emphasized the need for money through increased rates and the attracting of men to the industry to carry on such a program.

The importance of mining to the electrical industry was brought to the meeting by Robert S. Palmer, executive secretary, Colorado Mining Assn., who reviewed both the pessimistic and optimistic opinions relating to the metals resources of the nation. He dispelled the idea that nuclear energy would replace other forms of power. He felt that incentives to exploration should be given to the industry cooperatively rather than make this a function of the Bureau of Mines.

Opening the first afternoon session, W. J. Johnston, Mountain States Power Co., Casper, recalled that the first transmission line had been built in the Rocky Mountains by the Nunn brothers and suggested that the 50th convention include a pilgrimage to the old towns of that Telluride system, which was the pioneer of the industry.

The afternoon session was an industry session. First speaker was Don Larson, manager, National Electrical Contractors Assn. chapter in Denver. He described NECA as an organization whose purpose would assist the industry by making electrical contractors aware of their obligations as well as their opportunities. Then he spoke of possibilities for work in adequate wiring, construction, lighting and home building. Larson ended his talk by a warning on the effects of the "overtime on overtime" rulings which became effective in September and was asked several questions about their application.

After telling "the story of clayramics," the industry of firing clay, and showing a slide film of a trip through the Locke factory, R. C. Bellezza, president, Locke Inc., Baltimore, showed what could be done to cut labor costs and inventory investment by reducing the number of types and standardizing of insulators and hardware. As one example, 192 designs of pin-type insulators were reduced to 17 and today 14 will do the job. Similar reductions in types can be made in all insulators and pole-line hardware.

"The American people are as lucky as hell and don't know it," said J. W. Mullally, manager utility sales, Anaconda Wire & Cable Co. He spoke of the wartime job of the industry when it had to deliver power, not alibis. The job ahead is gigantic, he said. John Q. Public demands and wants

Burdick Pinkerton Johnston Storey Buck

FORMEX
MAGNET WIRE
"TOUGH AS NAILS
SOFT AS SATIN!"

TRY FORMEX ON YOUR NEXT WINDING JOB!

Designed and developed by G-E for use in its own products, Formex Magnet Wire—with its tough, heat-resistant synthetic resin coating—is now available to all who repair or build electrical equipment.

FORMEX IS EASIER TO WIND!
Its extremely flexible, smooth, abrasion-resisting insulation makes Formex easy to handle and wind. Turns of the coil fall into place more readily, without having to be forced or jammed!

FORMEX SAVES SPACE!
One big advantage of Formex is its high winding space factor, or space saved. This means you can redesign machines to make them more compact, obtain the same output by using less wire, or improve performance by using more wire in the same space!

FORMEX HAS MORE FEET PER POUND!
Formex has more feet of wire per pound than any other type except enameled wire! Since magnet wire is purchased by the pound but used by the foot, you can realize important savings in this respect alone!

Flatten it or knot it — FORMEX can take it!

Give Formex a 20% stretch, then hammer it flat or wind it on its own diameter. You'll find the insulating film undamaged! Formex is tough—many times more resistant to abrasion than regular enameled wire. This means you can step up winding speeds without increasing rejects, adopt coil shapes requiring acute angle bends, take short-cuts on coil assembly!

TO SPEED DELIVERY TO WESTERN USERS, FORMEX IS MADE ON THE WEST COAST!

For more information about Formex and other cable products, write or visit the nearest office of
GENERAL ELECTRIC SUPPLY CORPORATION

GENERAL ELECTRIC
SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE

more power and is going to get it someway. It is up to the enterprise system to see that it does the job.

Mullally reviewed the uncertain copper situation which is affected by the ERP demands, the threat of Stalin and the federal stockpile. The government is taking 2,500 tons a month.

"Let's do more asking for suggestions and advice before we attempt new cooperative plans or policies and we will have less chance for criticism or misunderstanding. When we are in fact so interdependent in this business. the greatest sin we can commit can lie in determining what we think is good for the other fellow without finding out first what he thinks about it." Thus spoke William A. Ritt, electrical contractor-dealer of St. Peter, Minn., and secretary of the highly successful Midwest Electrical Council. Ritt had preceded this with a discussion of the factors which have made the electrical contractor-dealer a better businessman and a description of the operation of the Council in Minnesota, North and South Dakota. It brings together local and state associations of electrical contractors for a 90% educational and sales promotional sales program. He surprised his hearers by saying that in 15 years this council group has invested more than a quarter million dollars of its own money, without subsidy of any kind and the organization's budget for this year is $40,000.

Tuesday morning's program flowed like a river from the need for action to the means of getting it, as John E. Loiseau, president, Public Service Co. of Colorado, opened with "The Rocky Mountain Story." L. M. Burdick, General Electric Supply Co., Denver, was session chairman. Loiseau, commenting first on previous speakers' talks, urged also that some funds be kept in reserve to make improvements when times may not be good. He then recited the ambitious program of the Bureau of Reclamation to duplicate the entire power network of the private companies in the Rocky Mountain states (see ELECTRICAL WEST, June, p. 38). He declared the reclamation act had never been intended as an instrument to nationalize the power industry, but a group in the Department of Interior made no bones about using it for that purpose. In its program it talks of developing load, said Loiseau, but what it means to do is to steal the load developed by the private utilities. He ended forcefully, urging the devotion of all energies to repealing of the discriminatory excise tax on power and resisting the nationalization of the industry.

Backing up Loiseau's theme, Edwin Vennard, vice-president, Midwest Service Co., Chicago, left no doubt in anyone's mind that the situation is part of a fight between the philosophies of individual freedom and collectivism, whatever it is called. The extent to which the collectivistic idea has penetrated in America he illustrated from opinion surveys. These surveys were conducted among businessmen, teachers, clergy and employees. Charts showed the percentage favoring ideas or methods which are basically collectivistic. It is a grave problem, he said, but it is real. Then he outlined things that must be done to inform a larger percentage of the public as to the advantages and disadvantages of both ideologies. He said it was a mistake to call all sympathizers for collectivistic ideas Communists or Socialists. "It does no good to blame them. Rather ask ourselves to what extent am I responsible for their lack of knowledge. As industry has grown larger, the gap between management and employee has widened and this gap must be bridged somehow." He ended by advocating: (1) Adopting and practicing policies that create and hold job satisfaction among employees. (2) Practice policies that make people like to do business with the company. (3) Survey employees and public opinion regularly. (4) Furnish facts about the enterprise system.

Loiseau

Ritt Clark

Collier Larson

For individual companies, he urged assignment of such responsibility to a key man in the company or the employment of an agency specializing in such activities. This strong presentation elicited many questions and comments from the executives in attendance.

Next topic, "Materials and Production—Keys to Future Prosperity," was presented by H. L. Erlicher, vice- president and purchasing agent for General Electric Co., Schenectady. He cited business conditions which should continue to be good for five years or longer, then discussed the pricing situation in steel. High prices in a competitive economy, he said, have always provided an incentive to develop substitutes and technical improvements. He also predicted that we may be closer to a healthy buyers' market than we realize and advised a continued watch on inventory.

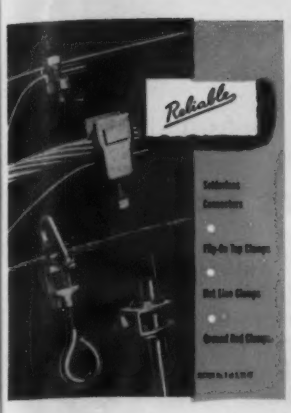
New processes, such as the continuous casting method in the steel industry, may cut costs and decentralize the industry. Other causes for optimism are promised in new methods, in new metals, new designs and new tools developed during the war years, as well as precision standards. Business is going to be good, but it might be on a slightly lower price plateau.

Reddy Kilowatt's pappy, Ash Collins, followed with more practical suggestions as to how to get the enterprise story over to the public. First he urged the industry to stop apologizing. get off the defensive, stop talking about internal problems to the public, sell up to dollar value, not down to penny cheapness, "tell the people that you expect a profit from your business," keep promoting and selling. dramatize the story, speed up public relations and advertising, crusade among the employees of the industry and, most important, talk to the young people. He then illustrated results of surveys among teenagers and showed an improvement in their attitudes toward the utility business where a youth program was carried on.

Banquet speaker was Dr. Adam S. Bennion, vice-president, Utah Power

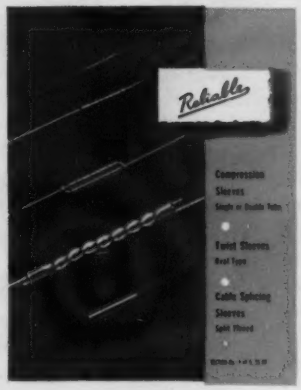
THESE NEW RELIABLE BULLETINS ARE NOW AVAILABLE SEPARATELY OR...

All in one catalog binder



SC Solderless Connectors, Flip-on Tap Clamps, Hot Line Clamps, and Ground Rod Clamps for power line construction and maintenance.

SD Straightline Splices and Deadends, Insulated and Combination Splices for all types of conductors—the standard of nearly all electric power companies.



SS Splicing Sleeves—double tube, single tube and compression types—for underground electric cables; copper and galvanized iron telephone wires.

Reliable

CS Cable Specialties—Service Cable and Telephone Drop Wire Clamps, Aerial Cable Hangers, and Cable Pulling Grips.

T Telephone Protective and Terminal Equipment for all station, line and central office needs. Reliable means freedom from maintenance problems.

RELIABLE ELECTRIC COMPANY

3145 Carroll Avenue
Chicago 12, U.S.A.

Darrin Dobel Starr Bellezza

& Light Co., who picked up the challenge in the two-day sessions and rolled them into "A Job To Be Done." It is a three-fold job, said Dr. Bennion: (1) To supply the needs of America; (2) To choose and train young people to be successors; (3) To build such a defense that the industry shall not be taken over by government, and that will put brakes on a program which has already socialized Great Britain and threatens to overtake the world. He discussed more thoroughly the finding and training of young men, urging use of college men during vacations, recruiting of graduates and provisions of scholarships for employee's sons. His own company's program for training of supervisory personnel was cited as one way to inform employees of the American enterprise story.

The final session was presided over by Harold T. Rankin, lighting sales manager, Public Service Co. of Colorado, who was later surprised by being elected president of the association.

"What an Association Can't and Can Do," a talk previously given to an Idaho contractors convention (see ELECTRICAL WEST, April, p. 65) was adopted to the general industry group by William A. Cyr, associate editor, ELECTRICAL WEST.

James A. Bell, director utility sales, Electromaster, saying that everyone has a selling job to do to sell himself, analyzed in an interesting fashion a means for testing the qualities which make up personality. A man's business life is entirely dependent upon what people think about him, he showed. "We go through life aiming our personalities at other people," he said, and described the bullseye at which everyone aims. In the bullseye itself are people close to them, such as their family. In the first circle are those who know them best, their intimates. The next circle are casual acquaintances and the other circle strangers. It is toward the two outer circles which most people aim their personalities. He then listed seven qualities given by Psychologist Castleberry. They are, in order of importance: (1) vitality; (2) appearance; (3) voice; (4) poise; (5) conversation; (6) business connection; (7) absence of personal problems.

The windup job is always given to Gaylord B. Buck, vice-president and general manager, Public Service Co. of Colorado. With the zeal of an evangelist, he summarizes the thoughts in the talks of all the speakers and preaches a sermon from them. In this convention, he said, it was shown that the electrical business "is our business. We have created it. We have put our lives into it. And as Mr. Loiseau said, we will not stand and see the things we have given our lives to taken away. "All speakers," he said, "had told us that we: (1) Must look at the job; (2) look at ourselves; and (3) equip ourselves with the tools to do it. In order to receive," he said, "you must first give. The best has not been done, and if we look toward the horizon and see the opportunities, we will be able to invite into the industry the young men who will carry it on."

To close the convention, a short business session elected Harold Rankin as president and four vice-presidents, namely, H. L. Pinkerton, Public Service Co. of New Mexico; W. D. Johnston, Mountain States Power Co., Casper; J. W. Cryder, Colorado Central Power Co., and R. H. Adams, Hendrie & Bolthoff Co., Denver. W. C. Sterne was re-elected treasurer and Harry Adler assistant treasurer. Both are from Arvada Electric Co.

Northwest Group Plans Year's Work

Howard N. Walters, general sales manager, B. C. Electric Railway Co., was elected vice-president of the Northwest Electric Light & Power Assn. at a meeting of the executive committee, Sept. 10, at Timberline Lodge, Ore. Walters, who has been active in the association for many years and was last year's chairman of the Business Development Section, is elected to fill the office left vacant by the resignation of J. E. Corette Jr., Montana Power Co. Corette had found it impossible to serve in this capacity during the current year.

W. L. Thrailkill, Washington Power Co. president, announced the appointment of the following section chairmen: Accounting, Frank Copithorne, B. C. Electric Railway Co.; Business Development, J. F. McAllister, Utah Power & Light Co.; Engineering and Operation, L. R. Gamble, Washington Water Power Co.; Personnel, L. T. Matter, Puget Sound Power & Light Co.

Plans were laid for an active year with the four sections meeting in their own conferences next spring. The Accounting & Business Practice Session is tentatively scheduled to meet in Vancouver, B. C., June 23 and 24. Tentative arrangements have also been made for holding the Business Development Section conference at Salt Lake City, May 9-11, 1949. Time and place of the other two meetings have not been scheduled.

The new Manufacturer-Jobber-Dealer-Contractor Bureau of the Business Development Section is again to take prominent part in the section activities with Walter Potter, Lamp Dept., General Electric Co., as chairman.

Independent status was given to three special committees heretofore functioning under one of the sections. These are: rate research committee, with Walter Hendron, Utah Power & Light Co., chairman, to study load characteristics in relation to rates; purchasing committee, headed by J. A. Riner, Washington Water Power Co.; advertising and publicity committee, whose chairman is Frank Swearingen, Puget Sound Power & Light Co.

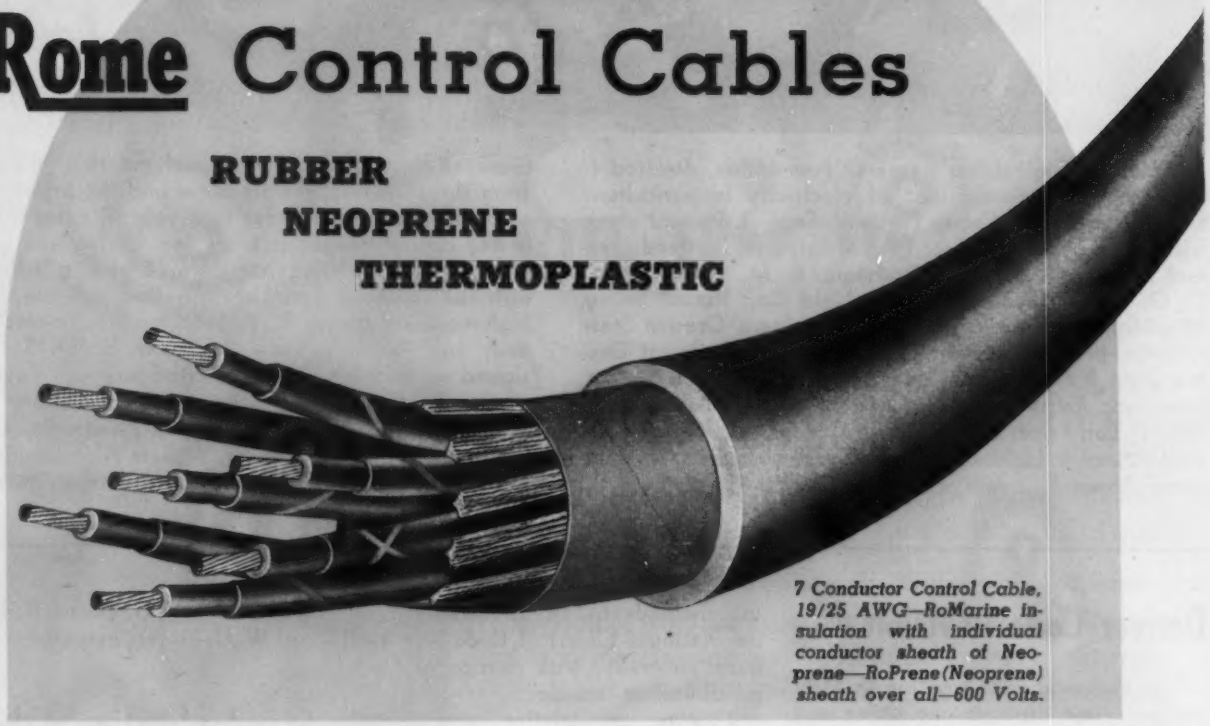
All the sections will lay out their programs for their spring conferences at executive or planning meetings this fall.

TO ELIMINATE CONTROL CIRCUIT FAILURE...

Specify

Rome Control Cables

RUBBER
NEOPRENE
THERMOPLASTIC



7 Conductor Control Cable, 19/25 AWG—RoMarine insulation with individual conductor sheath of Neoprene—RoPrene (Neoprene) sheath over all—600 Volts.

Protect those vital control circuits . . . the "nerve system" of your whole distribution network . . . with the dependability of Rome Control Cables. You can ill afford the loss of revenue and customer good will when outages occur from control circuit failure. As a matter of fact there is no need to run that risk. Rome Control Cables are manufactured to one standard of quality . . . the highest . . . and carry with them a sense of responsibility for dependable and unfailing service.

In Rome Control Cables, too, you will find variety of construction to meet your particular requirements. In the design of individual conductor insulation, as well as outer protective sheath, Rome Synthinol* thermoplastic, rubber, and Neoprene compounds can be combined, or used together, to provide the ultimate in service performance. Two typical Control Cable constructions are described in Specifications **CT-1** and **CRM-1.** Write for your copies today.

*TRADEMARK REGISTERED

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

PACIFIC ELECTRO SALES, INC., Pacific Coast Agents

SALT LAKE CITY 1, UTAH
419 Beneficial Life Bldg.

PORTLAND 9, OREGON
1233 N. W. Twelfth Street

LOS ANGELES 21, CALIF.
2038 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3401 Fourth Ave., So.

Agricultural Engineering Research Foundation, devoted to research on economic uses of electricity in agriculture, held its annual meeting in Portland, Sept. 3. Present clockwise around the table are: Fred G. Hodge, Portland General Electric Co.; Wade Newbegin, R. M. Wade & Co.; C. O. Bunnell, Pacific Power & Light Co.; Russell Saling, Westinghouse Electric Corp.; J. B. Rodgers, Oregon State College, project director; Berkeley Snow, Northwest Electric Light & Power Assn., treasurer; R. V. Stockton, farmer, president; Ralph S. Besse, Oregon State College, secretary; F. Earl Price, Oregon State College, C. A. Root, Pacific Power & Light Co.; Fred Cockell, poultryman; Ambrose Brownell, poultryman; A. C. McMicken, Portland General Electric Co. The annual meeting heard reports from the secretary, the treasurer and the project director, and approvd a budget for next year to carry on research in hay curing, garden pea shelling, drying and storage of gladiola bulbs, drying ear corn, brooding turkey poults with radiant heat, sprinkler irrigation and rehydration of high-moisture crops. R. V. Stockton was re-elected president and Berkeley Snow, treasurer. Ralph S. Besse resigned as secretary and J. B. Rodgers was elected in his place. Trustees, in addition to Stockton, are Ambrose Brownell, A. C. McMicken, Wade Newbegin, George T. Bragg, Pacific Power & Light, William A. Schoenfeldt, Oregon State College, Robert Warrens, farmer, Forest Grove

Denver Code Revision

The electrical code revision in Denver has gone through one phase and is now into another. Since May of this year a building code revision committee, appointed by Mayor Quig Newton, has been working on revision of Denver's building codes. An electrical advisory subcommittee, under Mr. Gould of the building trades council as chairman, has worked on electrical rules. The committee consists of E. P. Hodges, Public Service Co. of Colorado; Clyde Williams, IBEW; Carl Krummel, NECA; Don Larson, manager, NECA; Paul Wright, advising electrical engineer; Mrs. Patricia H. Malloy, attorney, advisor on legal matters; Mr. Conroy, small homes association; Jack Fisher, IBEW advisor; V. C. Moulton, Mountain States Inspection Bureau, advisor. John Malipied, city electrician, and C. B. Farrah, assistant, represented the city electrical department.

A report of this committee recommended a continuation of the all-metal system which has been the rule in the past. The home rule status of Denver is that any new code cannot be adopted by reference, but must be completely printed. This runs up the cost. With the exception of restricting wiring methods to an all-metal system, the National Electrical Code was used quite generally, with change of "permissibles" to "musts."

This recommendation went to the building code committee and came back with an order that the code should include non-metallic sheathed cable but not armored cable in one- and two-family dwellings. The draft, thus being revised, may even include recommendations for knob and tube and armored cable.

Contractors and union, however, may present the all-metal ordinance draft to the council for independent action. Cited in favor of the all-metal ordinance is Denver's low fire loss from electrical causes. It is only 2% against the national average of 10%. The union also advanced the all-metal system as an aid in lightning protection, since the steel network in a residence or building would tend to drain lightning charges. Sales control is not included in the ordinance but will have to be submitted as an independent ordinance.

● M. M. Ewell is the newly elected chairman of the Portland section of the American Institute of Electrical Engineers. Other new officers are R. B. Temple, vice-chairman; H. Arnett, secretary-treasurer; J. D. Franz, W. Porter, W. D. Duffy, R. L. Rorden and W. G. Meyer, executive committee.

Standardization Asked

Working towards nation-wide adoption of a standard building code the President's Conference on Fire Prevention discovered that in 3,322 municipalities surveyed 1,342 had no code whatever and 612 had codes over 20 years old. It likewise found that adoption of modern codes was deterred by expense and much had to be done in many states to enact legislation to permit codes to be adopted by reference. Committees are being set up in various states to work toward that end.

Meanwhile the Building Officials Conference of America is drawing a basic recommended code for the building industry, including electrical. The electrical part of it would be the National Electrical Code. Industry suggestions were made to it and the committee met in New York Sept. 9-12 to analyze and incorporate these ideas and produce an acceptable proposed basic code. The president's committee was called together because of a steadily mounting fire loss. It consists of mayors, building department officials, fire prevention authorities, insurance companies and other interested groups.

Reduce Cableway Costs

WITH TRANSITE DUCTS

YOU GET EVERY ADVANTAGE necessary for lowest cost distribution systems when you use Transite Conduit and Korduct. The greater strength of Transite—made of asbestos and cement—protects cables from traffic pressure and vibration. Tight joints shut out seepage—reduce possibility of water damage to sheath.

Transite Ducts are incombustible—this confines burnouts, protects adjacent cables from fire. Transite Ducts give lasting service because they are inorganic and non-metallic . . . immune to rust, rot, corrosion and electrolysis.

When streets must be opened, however, for cable installation or direction changes, the job can be done faster with Transite Ducts for several reasons. Long, lightweight lengths—a complete line of fittings—simple coupling method—all combine to make faster assembly. Smooth bore makes long cable pulls easier.

For further information explaining how Transite Ducts reduce cableway costs, write for Data Book DS 410, Johns-Manville, Box 290, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville **TRANSITE DUCTS**

CONDUIT for use without concrete

KORDUCT for concreting in

Turnbull Mrs. Dee Price Van Kampen Nelson Buchanan

IEA GIRDS FOR ITS MARKET

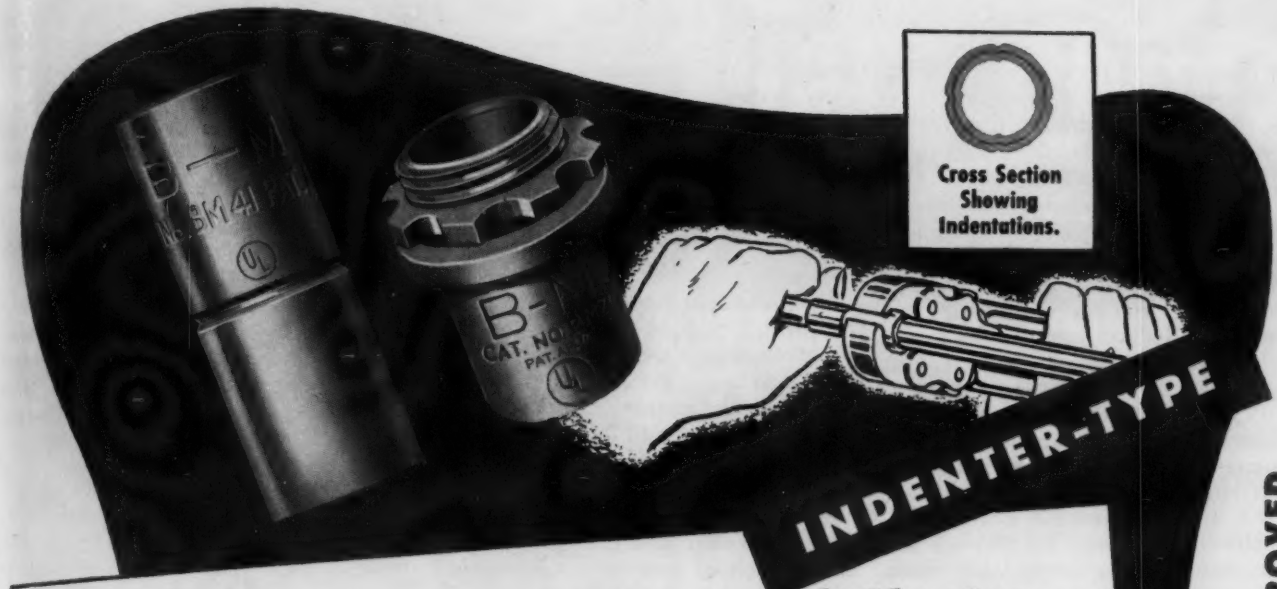
IT was like a meeting of the board of directors of a business. They came to get the realities of the situation. They reviewed conditions as they exist. They took a look at the future. And they considered the things they must do, take care of, watch out for, and avoid in order to make the business a success. Such was the down-to-earth and helpful character of the second annual conference of the Intermountain Electrical Assn., held in Salt Lake City's Hotel Newhouse, Sept. 24-25. It was attended by about 180 owners of electrical dealer or contracting businesses, executives of wholesale and distributing firms, manufacturers' representatives and utility sales people from Utah and Eastern Idaho.

In welcoming the group, Howard Price, assistant general manager, Salt Lake Hardware Co., president of the association, spoke to them as owners of businesses and executives. Interdependent, he said, what is good for one segment of the industry is good for the others. The purpose of the organization is to bring electricity's benefits to the public through concerted effort and team work. The conference brings prominent speakers with messages of value, provides a meeting ground with competitors and friends for constructive mutually beneficial action, he explained. E. M. Royle, prominent Salt Lake City dealer was chairman of the first meeting.

Reporting on things in the power supply end of this joint undertaking was George M. Gadsby, president, Utah Power & Light Co. He let his hair down too to place the situation squarely before the group. *You, We and Us* was his title. The "you" was the situation and opportunity facing the dealers, contractors, distributors and manufacturers. He broke it down into meaningful figures—for each dollar in electric service sold by the utility dealers sold $1.03 in appliances in 1947, will sell $1.10 in 1948. By 1953 he predicted a $20 million market for appliances, farm equipment and wiring in the area. Under "we" he told briefly what the company was doing to raise money and to build almost $70 million in increased service facilities in the next five years. He was very frank regarding the finance problem, taking the industry completely in his confidence. The "us" related to the stake all have in the kind of economy that is decided upon in the nation—a free enterprise one or a planned socialistic one. Showing what the Bureau of Reclamation planned in its program to nationalize the power industry, Gadsby said, "If the people want socialism, let them vote it. But it is a dirty subterfuge to slip it over on the people as 'reclamation.'"

Advertising, knowledge of market, successful worrying and public relations from the small dealer's point of view as presented by Marion Nelson, president of Gillham Advertising Agency, Inc. Even the smallest store has public relations — goodwill, friends, people who like to do business with it. It doesn't take a high priced counsel to tell any business to thank people for their business and treat customers in a friendly way. As to market, Nelson related the expansion in the Utah region and what it could mean. For worrying, he advised, it did no good to waste it on world affairs or gloomy prospects. Instead, let that energy be directed to making the business better. Problems are also opportunities. "Turn faith back to yourselves as problem solvers rather than to the government," he urged. Naturally, as an advertising man, Nelson went into greater detail as to the kinds and qualities of advertising dealers could and should do. One significant statement — "Did you ever stop to think how positive the ads are in contrast to all the negative news in a paper?"

Rudy Van Kampen, Ogden dealer, presided over the afternoon session. W. I. Buchanan, Pacific Regional Manager, Frigidaire, San Francisco, told concisely of the "Selection and Training of Salesmen." A sound approach to selecting salesmen should be preceeded by finding how many salesmen a dealer actually needs by: 1. Deciding total sales potential for each product; 2. Of this total how much his own business should be able to sell; 3. How much selling the owner himself plans to do; 4. Considering the promotion and advertising, how many units of each type can a good man be expected to sell per year; 5. Geographic or other factors that would affect number of men needed; 6. How much each salesman should be able to earn. Buchanan said selling was too important to depend on hunches to select men. Training takes a real investment in a man. Both his personal history and qualifications and his tempermen-



Install E. M. T. Faster and Neater with BRIEGEL Thin-Wall Fittings

NEATER • FASTER • STRONGER • APPROVED

All B-M Fittings Carry the Underwriters' Seal of Approval

FOR faster, neater and stronger thin wall conduit connections insist on either Briegel Indenter or Twiston Briegel Self-threading type all steel, one piece connectors and couplings.

B-M Indenter fittings, the only approved couplings and connectors of this type, have long enjoyed wider use and application than any other method of installing E.M.T.

The new B-M Twiston Self-threading fittings now make it possible to have threaded, raintight E. M. T. connections without the use of dies. Two complete turns with a pair of pliers threads the tubing and screws the fittings into a locked position, which results in the strongest connection possible and one that will withstand severe vibration.

Whatever the thin wall job might be, you will find that you can do it neater, faster and better with Briegel UL Approved E.M.T. fittings.

BRIEGEL METHOD TOOL CO.

GALVA, ILLINOIS

DISTRIBUTED BY

The M. B. Austin Co., Northbrook, Ill. Clifton Conduit Co., Jersey City, N.J. The Steelduct Co., Youngstown, Ohio Nat. Enameling & Mfg. Co., Pittsburgh Clayton Mark & Co., Evanston, Ill. Gen. Electric Co., Bridgeport, Conn. Enameled Metals, Pittsburgh, Penn. Kondu Mfg. Co., Ltd., Preston, Ontario

tal characteristics should be weighed. Newspaper ads are not as good sources for finding men, he said, as exploring for likely prospects through the present organization, business acquaintances, users and friends.

Reasons for training he gave as these: 1. It steps up profits by increasing sales volume, promoting more sales and higher priced models. 2. Avoids excessive allowances and concessions resorted to by the untrained. 3. Reduces cost of sales supervision, for men stand on their own feet better. 4. Promotes a more loyal and permanent organization. As to training, said Buchman, where the owner or manager employing salesman himself is a successful salesman it is well worth his while to train personally the new men. He also advised that most manufacturers have excellent programs to help in this training. Ending, he quoted,

"The training of a salesman is like the training of a soldier. Like the soldier, the best salesman is the one who is trained to know his ground and above all to believe in what he is fighting for, and is then coached in self reliance so that he can fight alone if need be."

What the adequate wiring program means to the dealer and the contractor was next told in detail by Elbert Kramer, Westinghouse Electric Supply Co., Los Angeles. After showing the National Adequate Wiring Bureau slide film, he broke down into dollars and cents in Utah what the program could mean. With 7,500 homes built per year in the area, or 37,500 in five years, at the present rate of certification 85 homes will be adequately wired in 1948, 7,415 not.

For each adequately wired home the industry gets about $720 in cost of wiring and appliances (about $276 in wiring), whereas in the non-certified house only $318 (wiring $156). So it loses $402 for each of those 7,415 houses (120 in wiring). "We win or lose together," concluded Kramer. "Everybody loses if anyone falls down on this job. The time to get going is now, while building is booming."

What an Association Can't Do and What It Can, a talk of similar nature to that published in the April issue, was given by W. A. Cyr, associate editor ELECTRICAL WEST to conclude the afternoon session.

The employee phase of running a successful dealer business was emphasized at the evening banquet, at which Ray Turnbull, commercial vice-president, General Electric Co., San Francisco, was the speaker. He was introduced by E. L. Dee, manager, G-E Lamp Department, Salt Lake City. Each business, said Turnbull, has three kinds of customers — product customers who buy the services or products; risk customers, who invest their money in it; and job customers, who invest their working time in it. Each must be sold on the company. The employer wants skill, care, a reasonable effort and hopes his employee will be satisfied enough to come back the next day. The employee, he said surveys had discovered, asks of the job: 1. Pleasant surrounding in which to work; 2. A good boss; 3. Good pay for equivalent work; 4. Steady work; 5. A chance to get ahead; 6. To be treated with respect; 7. To know what's going on; and 8. Interest in his work, or a feeling of doing something worthwhile.

Of each of these Turnbull spoke awhile and then ended with a plea to employers and supervisors in regard to the young people entering their business. He urged that they be encouraged to keep their ideals and to cultivate their ideas, for business exists from the development of ideas.

Saturday morning's session, chairmanned by Eldon G. McKell, manager, Consolidated Hardware Co., Provo, was opened by an encouraging and optimistic catalog of industries coming to Utah and Idaho and expansions of existing industries there. Steel industry expansion, copper refining, and even recent discovery of oil and gas promise to make the region the industrial center of America, said Gus P. Bachman, secretary, Salt Lake City Chamber of Commerce. With industry comes pay rolls, population, service industries and a need for appliances and wiring. Bachman ended his eye-opening talk with a plea to all business men to protect industry from the penalties and predatory taxations that politicians threaten it with.

The dealer has the ball in his hands now, that utilities no longer sell, J. J. Martineau, appliance sales manager, Graybar Electric Co., Salt Lake City, told the group, but that dealer needs the help of all the industry. Reminding the others in the industry of the multitude of details and functions a dealer has to attend to in running a business, Martineau said all should try to conserve that dealer's time by helping him with the very fundamentals of appliance selling. These he named as: 1. Effective advertising and prospect promotion; 2. Effective yet simple display; 3. Demonstrations; 4. Salesmanship and 5. Service. He then elaborated on the first three.

Martineau evaluated each type of advertising from a dealer point of view; he did the same with regard to various kinds of display. The latter, he reminded, is part theater, part salesmanship. Demonstrations dramatize the product. The talk contains so many practical hints for dealers that it may be reprinted here later either in full or in installments.

What television will do to change American living habits, entertainment, advertising and education was told the conference by Horace B. Lee, regional manager, Philco Corp., Salt Lake City. He admitted that the first stages of television, which that city is experiencing now, are disappointing. But he assured that once it gets under way smoothly it brings with it a number of big changes in the community. It is a fundamental invention, he declared. It tends to change family mode of living. People stay home more. It is a visual university of the air. Patronage at movies drops off. People demand much higher standards of entertainment from theaters but are content with less in television.

Lee predicted that television would soon become the fastest growing industry in the country. He said he felt advertising would swing to it and finance it. Radio, newspapers and magazines will feel this loss in revenue. Books too will feel the effect of televised instruction and entertainment. Surveys of television-equipped homes show that set owners prefer to look at television programs to listening to erstwhile favorite radio programs.

From a merchandising standpoint, said Lee, actual seeing of the goods advertised increases its identification with the sponsor. Radio listeners show only a 10% memory of who sponsors a program. Television viewers run about 75% on identification of product. As to program quality, Lee predicted it would improve soon and the movie producers would be found in the production end of television. As an aid to the local television situation Lee urged dealers to acquaint themselves with programs and sell them to their public. Likewise he advocated that each dealer use a set at home in order to be able to sell it from personal experience.

To close the conference Howard Price, IEA president, commended Carlos Stone, its manager, and J. F. McAllister, Utah Power & Light Co., program committee chairman, and S. B. Cooper, Graybar Electric Co., conference chairman, for the excellence of the affair. Ora Barlow, attendance, O. R. Bigelow, ladies entertainment, W. L. Kletting, banquet, and W. W. Bowman, publicity, were also thanked for their complete cooperation. Then Price repeated that the IEA was the sustaining and creative influence in the industry to which all should accept an assignment of responsibility. He asked all to talk the idea to their employees too.

TIGHT JOINTS

AT ALL POINTS . . . "VIA GRAYBAR"

Reliable Connectors, Splices

Graybar can supply everything your linemen need for connecting all types of lines *securely*. Some examples, made by Reliable: (1) Solderless tap connectors, with precision threads that maintain high-pressure joints. Composed of 90% copper high-strength bronze, they resist corrosion and are not subject to season cracking. (2) Flip-on tap clamps and hot line clamps. (3) Straightline splices, insulated splices, and splice reducers.

O-B INSULATORS

In these days of overloaded distribution systems, no line is stronger than its insulators. Graybar supplies superior-quality Ohio Brass insulators in strain, pin, and suspension types.

ONE SOURCE FOR ALL

For both transmission and distribution lines, Graybar has everything "from the bottom of the hole to the top of the pole"! By ordering all your pole-line needs from this single source, you save time and paper-work expense. You get the leading lines of poles, crossarms, insulators, hardware, strand, line trucks and tools. And you get them the quickest way possible — delivered wherever you specify.

Men who know your needs

When you call on Graybar, for supplies or for information, you can expect us to meet your needs both promptly and accurately. That's because Graybar has been familiar with your needs ever since the first lines went up. You're welcome to the help of the near-by Graybar Outside Construction Specialist in planning any pole-line or underground project. *Graybar Electric Company, Inc. Executive offices: Graybar Building, New York 17, N. Y.* 4846

SERVING THE ELECTRICAL WEST

PANORAMA OF THE PCEA

Edited by A. X. Schilling

Fall Conference

BECAUSE so many delegates found it inconvenient to attend the fall conference when it was held in December, this year's gathering has been moved up to Oct. 28 and 29. Previously, delegates found it inconvenient to be away from their businesses at a time when they were occupied with Christmas business, inventory or other end-of-the-year matters.

The actual program has been mailed to members. In case yours has been lost or mislaid, however, here are some of the reasons you should plan to be in Fresno on the 28 and 29 of this month.

The conference will open with a general assembly in the Californian Hotel ballroom, on Thursday at 9 a. m., with the opening remarks being made by President M. G. Sues. Last year's president, H. H. Courtright, will follow with a talk entitled "Let's Be Proud of Tomorrow," and G. C. Tenney will discuss "The Development of Electrical Manufacturing in the West." The morning sessions will conclude with a talk on "Releasing Human Potential Through Human Management," by A. Martin, assistant manager of General Electric company's Oakland Works.

The use and abuse of the check as a medium of exchange will be the topic to open Thursday afternoon's Administrative Services Section meeting, while the Business Development Section will discuss eight different subjects during its meeting. The Operating Economics Section will divide into a number of group meetings, each of which will consider a subject of prime interest to it.

Group meetings of the three sections will carry over into Friday morning, and all delegates will gather again for luncheon in the ballroom of the Californian. M. G. Sues will preside at the luncheon meeting, which will feature a talk by R. R. Gros, advertising manager, PG and E.

● DURING its recent meeting, the Board of Directors approved the attendance of V. W. Hartley, PCEA managing-director, at the convention of the International Association of Electrical Leagues in Washington, D. C. from Sept. 28 to October 2. Hartley is a past president of the group, now is regional governor.

● THOR CHRISTENSEN, chairman of the farm electrification handbook revision committee, has set the end of 1948 for the last of the current revisions. Committee members are now working on various sections to add new developments, and adding new sections to bring the book up to date.

Television

The newly appointed television committee, with H. C. Rice, Southern California Edison Co., as chairman, met on Sept. 1 and discussed the need for attention to television's problems, particularly the proper installation and maintenance of receiver sets. The group found that there is no problem in selling sets, but that a real problem exists in properly informing users regarding the causes and corrections of television interference. It was brought out that receiver sets often are blamed for disturbances resulting from natural causes and that many service men make calls only to find that the trouble has disappeared by the time they arrive at the user's residence or business.

● THE ADVERTISING COMMITTEE will meet in Fresno on Oct. 27, the day before the fall conference opens, to discuss a number of subjects pertinent to electrical advertising. Committee members are: Forrest M. Raymond, San Diego Gas & Electric Co., chairman; J. A. Corlett, General Electric Co.; Lester Healey, California Electric Power Co.; R. R. Gros, PG and E; H. W. Hayes, Southern California Edison Co.; James Scales, Leo J. Meyberg Co.; H. S. Schuler, Westinghouse Electric Corp.; H. E. Silvernail, Graybar Electric Co.; L. Wollenberger, Coast Counties Gas & Electric Co.; W. A. Cyr, ELECTRICAL WEST; Don Willis, Central Arizona Light & Power Co.

Board Meeting

During its Sept. 8 meeting in Los Angeles, the Board of Directors approved a resolution prepared by the resolutions committee expressing the association's regret at the death of James P. McElroy on Aug. 5. Mr. McElroy was division salesmanager. PG and E, Fresno, and had served as chairman on numerous PCEA committees.

The board received the report of the first meeting held by the safety rules committee and agreed with the committee in its effort to secure greater uniformity in safety rules among association members.

The advisability of resuming the district meetings that were held prewar was considered and their resumption next spring was discussed. It was decided to take no action this fall, however.

The board also voted to express its appreciation to the McGraw-Hill Publishing Co. for its assistance during the past year and particularly for the publicity it gave the June convention.

R. N. Dreiman, who was elected during the convention as a director to replace Charles Grunsky, whose term expired, was welcomed as a member of the board. Others attending the meeting were:

M. G. Sues, president; R. E. Asgast, I. W. Borda, W. E. Cranston, C. W. Goodwin Jr., Harry L. Harp, W. C. Mullendore, E. B. Smalley, F. A. Tracy, E. D. Sherwin, H. H. Courtright, R. R. Walbridge, V. W. Hartley, managing director, and H. H. Cleland, a past president, who was a visitor.

Shell Research developed this

SHELL TURBO OIL

to help extend the running time of turbines

Weak oils can cut down turbine efficiency

Likely you've seen what happens—how ordinary oils oxidize, break down into sludge, "gum up the works" —even cause rust. Result: shorter running time and higher operating costs.

Shell's answer: a doubly fortified lubricant

Shell Research specifically developed an oil for turbine use—Shell Turbo Oil. To build this oil, Shell selects only crude stocks naturally high in oxidation-stability—sludge resistance. Then, with Shell-developed additives, Shell Turbo Oil is doubly fortified. Once to build up its naturally high resistance to oxidation. Again to assure exceptional rust-preventing quality.

What you as a Shell Turbo user can expect

Little or no trace of sludge, no rust, no breakdown in the oil. In fact, Shell Turbo Oil has been delivering exactly that kind of lubrication performance in all types of installations—and always to the end of extending the running time of turbines.

SHELL

ARE YOU ABSOLUTELY SURE YOU ARE GETTING ALL THAT'S NEW IN LUBRICATION?

Your Shell Lubrication Engineer can make a complete study and analysis of your plant and machines... give you engineering counsel, advice on new lubricants and their application... help you set up schedules and controls for each and every machine. For that kind of service, call in your Shell Lubrication Engineer.

Quick Catch-up

IES

September saw the beginning of a new year for the Illuminating Engineering Society officers, among which were two new regional vice-presidents. Eric E. Ackland, Canadian General Electric Co., of Vancouver, B. C., became the regional vice-president for the Northwestern region, and Theodore H. Shepherd, Department of Water & Power, Los Angeles, of the Pacific Southwestern Region. The Oregon Chapter has likewise become an IES section and Sacramento held a charter meeting for the beginning of a new chapter in that city on Sept. 16, at which time Dr. Leland Brown, professor of electrical engineering at Stanford University and regional vice-president of IES, presented the charter and installed the officers. The new chapter, to be known as the Mother Lode Chapter, has elected A. L. Perdue as chairman, P. W. Carrington as vice-chairman, W. J. Flynn as secretary-treasurer, L. E. Barnum and E. W. Wismer as managers, and Doyt Early as program chairman.

Officers of the other sections have been announced as follows: Northern California Section—Samuel H. Hazleton Jr., General Electric Co., Oakland, chairman; George R. Sommers, Sylvania Electric Products Inc., San Francisco, vice-chairman; Stanton M. Blacksmith, PG and E, Oakland, secretary-treasurer; board of managers include Charles T. Bakeman, Dan M. Finch, H. H. Robison, Carrell H. Wissing.

Oregon Section—Robert E. Lange, Eoff Electric Co., Portland, chairman; J. Daniel Webster, Pacific Power & Light Co., Portland, vice-chairman: Richard E. Staples, Portland General Electric Co., Portland, secretary-treasurer; board of managers include L. J. Collins, Jack De Ment, J. G. Galarneau, F. E. Webb.

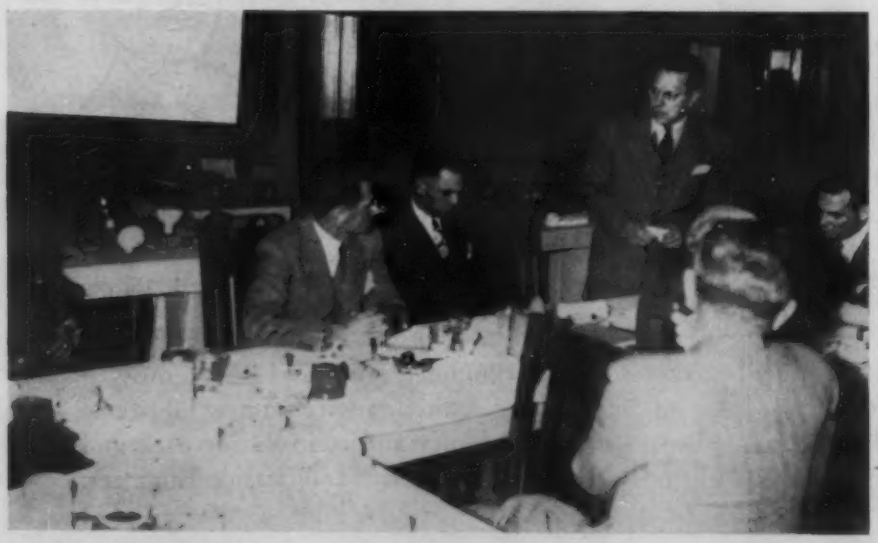
Southern California Section—Leonard W. Towner, General Electric Co., Los Angeles, chairman; Robert G. Knopp, Phoenix Glass Co., Los Angeles, secretary; board of managers include Edward Balogh, Thomas A. Esling, D. K. Grandey, J. Walter Howard, S. H. Simonsen.

Utah Chapter, Illuminating Engineering Society, held a recent dinner meeting at the Utah Hotel. Heard James M. Ketch from General Electric Co., Nela Park, talk on "Lighting Design Techniques in the Field of Commercial Lighting". . . September meeting at the Newhouse Hotel featured Dr. L. W. Brown, Stanford University, with a talk on the IES, what it is, its aims and function; also had a report of retiring officers and installation of new officers.

● The Illuminating Engineering Society has appointed G. Ross Henninger as director of publications effective Oct. 1. After being graduated from the Unversity of Southern California in 1922, Henninger worked as a utility engineer with Southern California Edison Co. Two years later he joined the editorial staff of *Journal of Electricity*, which later became Electrical West, and served as engineering editor of the magazine for six years. Since 1930 he had been editor of AIEE's *Electrical Engineering*.

Henninger

When IES group from Northern California went to Sacramento to start a new chapter there, H. H. Robison (cut off at extreme left), Al Purdue, Sacramento Municipal Utility District, who ran the meeting, Dr. Leland H. Brown, Stanford, regional vice-president, were greeted by Clark Baker Jr., president of Sacramento Electric Club, which sponsored the first meeting. It was chartered Oct. 1



EMEA

Without a regular dinner meeting the Electrical Maintenance Engineers Association of Southern California held a recent meeting at the Kierulff & Co. studio auditorium to hear Robert Newcomb, president, Newcomb Audio Products Co., speak on "Public Address & Music Systems for Industrial and Custom Use," and to inspect a wide variety of equipment and new developments in sound apparatus. The EMEA also submitted to its membership some changes in by-laws, which would make the selection of officers somewhat simplified. The proposed changes would have the president appoint a nominating committee and thus set up a slate of officers each year for the membership to approve rather than have nominations and elections from the floor. A vote on the amendments was to be taken in September.

Panel of members of the Electrical Maintenance Engineers Assn. of Southern California led a round-table discussion of maintenance problems at the Sept. 15 dinner meeting in Los Angeles . . . the group's annual Fellowship Smoker is scheduled for Oct. 29 at the Rodger Young auditorium.

Save Money!

SEAL—TERMINATE—INSPECT
without disturbing other equipment

Use O.Z. "J" Terminators

The special collapsible design feature of O.Z. "J" Terminators saves time and effort in electrical installations . . . reduces maintenance costs. Here's how the "J" Terminator saves you money:

- **Efficiently seals and terminates conduits and cables outside cabinets.**
- **Permits subsequent inspections or current checks without circuit interruption by merely dropping sleeve.**
- **Serves as pulling and splicing chamber.**
- **Collapsible feature permits terminating conduit at enclosure, or terminating conduit and then continuing run.**

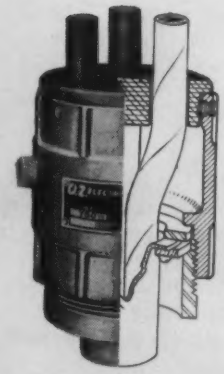
"J" Terminator in conduit to conduit run.

"J" Terminator in the open position.

Final installation with "J" Terminator tied into box by chase nipple, furnished with the fitting.

In addition to the "J", O.Z. makes a complete line of terminating potheads, compound bushings and sealing bushings for lead and rubber-covered, braided, and armored cables. With these designs, it is possible to meet all industrial requirements.

When special equipment is needed, our engineering department is prepared to cooperate with you. Write O.Z.'s Service Manager now, for a detailed catalog of electrical fittings.



TYPE "CLC" TERMINATING POTHEAD. A compact terminator designed for lead-covered cable. It seals the cable and grounds the lead sheath. Body of fitting screws directly on the conduit.

THEY'RE O.K. IF THEY'RE O.Z.

CONDUIT FITTINGS · CAST IRON BOXES · SOLDERLESS CONNECTORS
CABLE TERMINATORS · GROUNDING DEVICES · POWER CONNECTORS

O.Z. ELECTRICAL MANUFACTURING COMPANY
262 BOND STREET BROOKLYN 2, N. Y.

4286

Light FOR A
MILLION DOLLAR MARKET
New Smoot-Holman "Educator"
Improves Indirect Lighting
In Schools
Manufactured under patent No. 2303747
Smoot-Holman's new RE 500 Educator is designed to provide "safer" light — better vision — for students in every type of classroom. The Educator's concentric rings distribute maximum effective lighting on reading and writing surfaces. The assembly of matte finished rings presents an extremely low surface brightness and eliminates the accumulation of dirt, paper wads or insects.
SIMPLE AS A B C TO INSTALL
SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD CALIFORNIA
MADE IN U.S.A.
MANUFACTURERS OF
FINE LIGHTING EQUIPMENT
OFFICES IN PRINCIPAL WESTERN CITIES • BRANCH AND WAREHOUSE IN SAN FRANCISCO

Electric Clubs

East Bay Electric Club, Oakland, began its new 1948-49 term with newly elected officers in September. Henry Muller, manager, Westinghouse Electric Supply Co. branch in Oakland, succeeds E. L. Buttner, Scott-Buttner Co., as president. Walter Vance Jr., Pacific Electric Motor Co., becomes vice-president, and Irving Murray, Gilson Electric Supply Co., becomes secretary, succeeding R. P. Zakel. The directors will be Thomas Janes, University of California; D. H. Hansen, chief electrical inspector, Oakland; Leo C. Fox, Gilson's; Walter Howell, PG and E; Don Relfe, Port of Oakland; Harold Knopp, Knopp Instrument Co.

Sept. 20 meeting featured a movie, *Power By Which We Live*, presented by General Electric Co. . . . following week Jack Hennessy, Associated Home Builders of Alameda County Inc. was guest speaker.

Sports Director Ira Blue of radio stations KGO-ABC, San Francisco, pitched on television sportcasting at the San Francisco Electric Club meeting on Sept. 13.

NECA

Paul Jussel was installed as president of the Rocky Mountain Chapter, National Electrical Contractors Assn. on Sept. 1. Karl Krummel is the new vice-president; E. E. Snowden, secretary; Dale Strohminger, treasurer; N. R. Mendenhall, new Denver board member; J. A. Simpson, Cheyenne board member; James Flavin, Casper board member; J. E. Peters, Laramie board member; and J. E. Collier, board of governor's representative.

Northern California Chapter, NECA, met on Sept. 14 for a dinner meeting in Emeryville. Guests were Larry Soare and D. H. Hansen. . . . Held a regular luncheon meeting at the Athens Club in Oakland on Sept. 21.

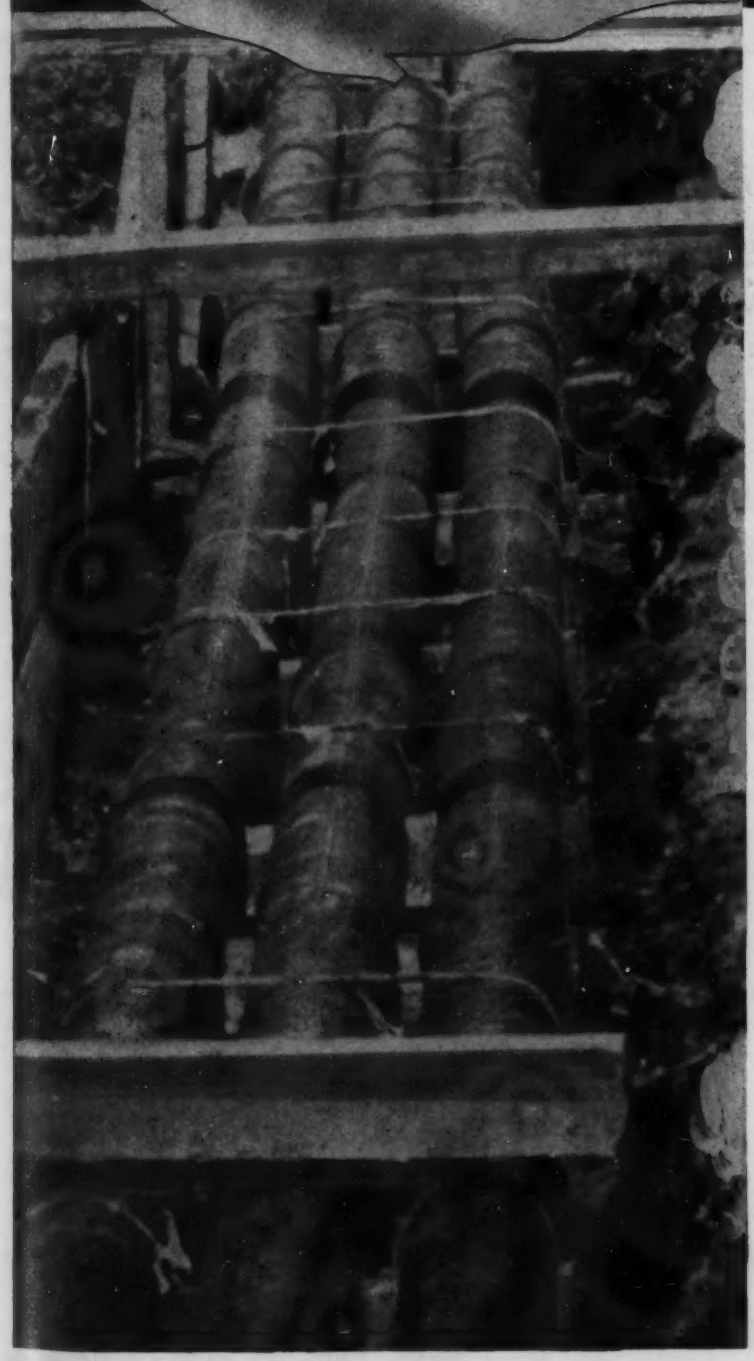
Alameda County Branch held its regular September luncheon meeting at the Athens Club, Oakland.

IAEI

Southern California Chapter, International Association of Electrical Inspectors, has scheduled a section meeting in Oakland.

Puget Sound Chapter's last regular quarterly meeting was in Vancouver, Wash. Main speakers were J. A. Tallman, Owens-Corning Fiberglas Corp., with a talk on Fiberglas insulation; and V. B. Jones, electrical engineer, Tacoma City Light, on the subject "Northwest Power Pool". . . next meeting will be Dec. 4 at Tacoma.

A Tip From The Underground...



Here is the tip-off to all who are interested in the long-term performance of power and communication cables.

ORANGEBURG FIBRE CONDUIT when inspected after 50 years underground proved itself to be as serviceable as on the day it was first installed.

When you install ORANGEBURG FIBRE CONDUIT you protect cables from 1. Cable Sheath Abrasion. 2. Pulling Tensions. 3. Corrosion. 4. Cable Movement. This protection is permanent and all-embracing.

ORANGEBURG is light in weight, easy to handle, transport, install . . . a product of low initial cost and low maintenance . . . a product that resists corrosive ground waters and chemical wastes permanently.

The Electrical Industry has used ORANGEBURG FIBRE CONDUIT for over 50 years as the ideal protection of cables.

The informative ORANGEBURG Catalog No. 49 is yours for the asking. Write today! Keep it for ready reference in your files.

Technical Bulletin A. C. 48 is also available. It explains the use of 5° Angle Couplings with short lengths in place of special long radius bends.

Orangeburg Manufacturing Co., Inc.
Orangeburg, N. Y.

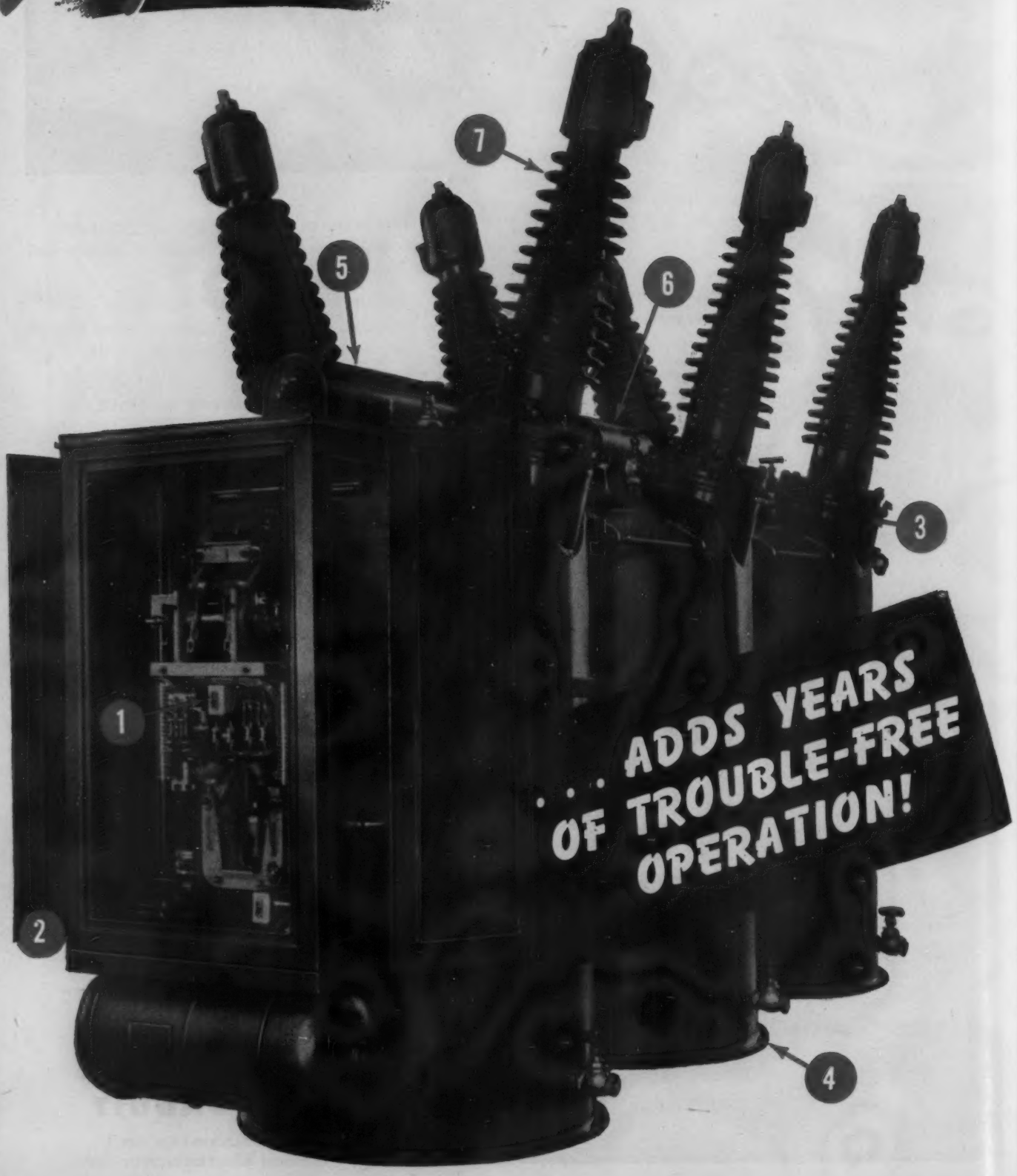
Orangeburg Standard—For installation with concrete encasement.

ORANGEBURG
FIBRE CONDUIT

Distributors—GRAYBAR ELECTRIC CO., INC.
GENERAL ELECTRIC SUPPLY CORP.

ALLIS-CHALMERS

Improved BZO-160



Oil Circuit Breaker

1. MECHANICALLY TRIP-FREE pneumatic operator provides 20-cycle reclosing.
2. WEATHERPROOF CABINET with 2 double-hinged doors . . . permits complete accessibility on 3 sides.
3. BUSHING TRANSFORMERS removable from top or bottom of wells.
4. EXTENDED TANK WALLS protect dome bottom . . . provide flat base for installation.
5. WEATHERPROOF HOUSING protects pole unit mechanism and transformer taps.
6. SMOOTH, STREAMLINED top and housing eliminates corrosion-inviting crevices.
7. SEALED BUSHING types embody high electrical and mechanical standards of safety and low maintenance cost.

ASK FOR COMPLETE STORY of BZO-160 oil circuit breakers — furnished in ratings 115 kv and higher; with interrupting capacities up to 3,500,000 kva; circuit interruption within 5 cycles, reclosing service within 20 cycles.

Rupter is an Allis-Chalmers trademark

MAINTAIN YOUR STANDARDS of service with "5-20" performance . . . interruption in 5 cycles, reclosing in 20! You get *that* protection in ratings 115 kv and higher by installing Allis-Chalmers *improved* BZO-160 oil breakers.

REDUCES CONTACT MAINTENANCE

TWO SINGLE-BREAK RUPTOR interrupters assure fast, positive interruption . . . *within 5 cycles!* They are based on standard A-C design backed by years of service . . . known for low arc energy circuit interruption that means long contact life and low oil deterioration. Simple construction, free of complicated mechanisms and serious alignment problems, permits quick contact inspection.

IMPROVED HIGH SPEED PNEUMATIC OPERATION, with fast magnetic trip, aids high speed contact separation . . . provides 20-cycle reclosing that helps you maintain better service continuity and system stability. It is *mechanically trip-free* . . . assures instantaneous reopening should breaker close on a fault!

BUILT FOR LONG LIFE

CAREFULLY SELECTED MATERIALS for all parts, from tanks to contacts, minimize chance for mechanical failures. Number of routine inspections per year is reduced by liberal Allis-Chalmers construction.

ALL-AROUND WEATHERPROOFING protects mechanisms . . . prevents deterioration.

For more complete information on the BZO-160 outdoor oil breaker, contact your nearby A-C office for literature, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2346

Call Allis-Chalmers for circuit breakers—Indoor 2.5 to 34.5 kv... up to 1,500,000 kva: Outdoor 7.5 to 230 kv...up to 3,500,000 kva.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment From Generation Through Utilization

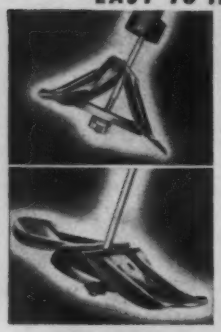
P-L*
EARTH ANCHORS

*REA APPROVED

P-L ALL STEEL, EXPANDING TYPE EARTH ANCHORS

Here is the first really efficient, two-piece earth anchor that is of simple, fool-proof, all-steel, heavy-duty construction. P-L Earth Anchors are exceptionally rugged and possess tremendous holding power. P-L Anchors can do a better job and can be installed quicker in all types of soil. Everyone from the engineer to the lineman can appreciate the ease of handling and installation.

EASY TO INSTALL



P-L Anchors come to you as assembled units. Built of two simple pieces of heavy steel plate. A few blows of the tamping bar and the sharp edged blades cut deeply and permanently into solid, undisturbed earth.

FOR LITERATURE WRITE

PIEPER-LILLARD
INCORPORATED
ST. LOUIS 1, MO.

Central California Chapter IAEI at its recent meeting in Fresno discussed the need for county inspection in Fresno County, H. G. Ufer, secretary-treasurer of the Southwestern Section, gave a talk on the history of the association. Mr. Doorschodt, Thomas-Betts Co,. discussed the use of connectors. It was suggested that contractors, inspectors, and power company get together to iron out difficulties over some installation practices. A panel consisting of H. G. Ufer, George Hayden, Ray Colby and R. V. Jones answered questions regarding the code. L. B. Sterling, chief inspector, Fresno, presided. Next meeting will be held at Taft, Oct. 16, with J. W. Phillips as chairman of arrangements.

Luncheon club of inspectors, an idea suggested by R. B. Maxwell, city inspector, San Jose, held an initial meeting recently in that city. Another meeting is to be held soon at Palo Alto for active inspectors only. Aim of the club, according to Maxwell, is to get more uniform interpretation and enforcement of the codes and work toward a uniform electrical code for California. Membership would be active inspectors with local electrical contractors as guests where meetings are held. Discussion of current issues would be held to promote better understanding. Where recommendations were in order they would be passed on to the chapter and section for action.

Leagues

On Sept. 1 A. K. Chamberlain, partner in the firm of Refrigeration Equipment Co., took office as president of the Bureau of Radio & Electrical Appliances of San Diego County. Serving with him for the fiscal year are J. F. Zwiener, Zwiener Electrical Co., first vice-president; R. T. Redfield, Graybar Electric Co., second vice-president; Sam L. Hall, Electric Supplies Distributing Co., treasurer, and O. G. "Tommy" Thompson, General Electric Supply Corp., last year's president, who automatically serves for the coming year as immediate past president.

Directors for the bureau are Charles Beall, Beall's Furniture & Appliances, National City; Taylor Brown, Parmelee Dohrmann Co.; Gordon Dawson, Home Appliance Co.; Paul A. DuPont, Walker's; Harry Franz, Harrington's Appliances; Robert D. Halvorson, R. D. Halvorson Co.; La Jolla; Elmer B. Hazie, San Diego Auto Electric Co.; Jerry Heilbron, Heilbron Electrical Co.; Ben Hurt, Eklund's Appliances, La Mesa; E. W. Kinmore, Kinmore Electric Co., Chula Vista; Ivan Lauritzen, S. D. Standard Electric Corp.; Bernard MacLean, MacLean's Appliances; E. W. Meise, San Diego Gas & Electric Co.; E. C. Phillips, Coast Electric Co.; W. W. Powell, Western States Electric Co.; B. H. Reynolds, Reynolds Electric Co.; Ben H. Rogers, Westinghouse Electric Supply Corp.; Gordon Scharfenberg, Gordon's Refrigeration Construction; Robert Shaffer, Shaffer & Duff, Oceanside; Robert E. Swearengin, El Cajon Supply Co.; Aubrey Thompson, H. L. Benbough Co., Ltd.; Harvey Watt, Western Radio & Television Supply, and Lou C. Wiese, Wiese's Ltd.

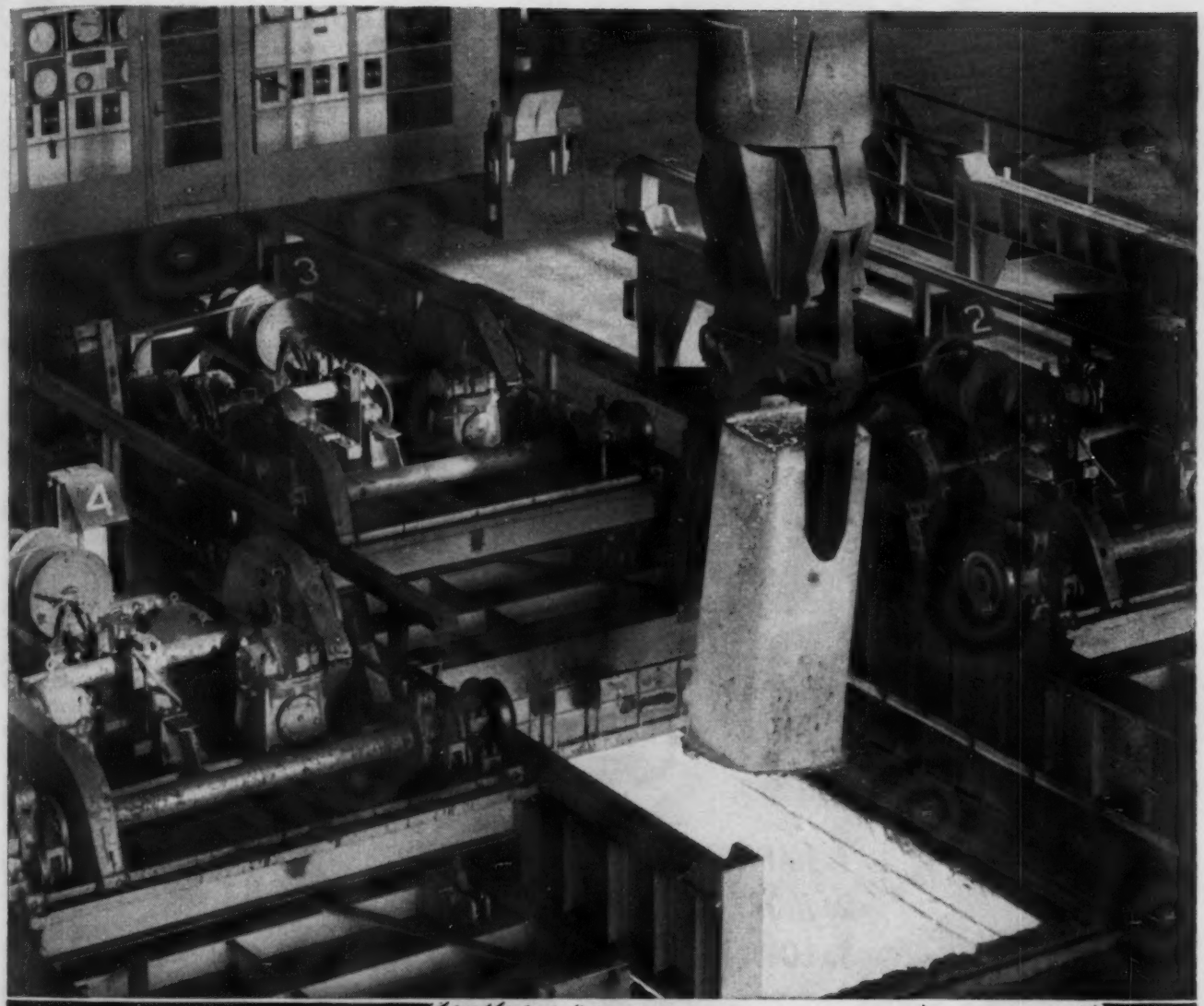
The bureau-sponsored fall and winter business and sales training classes started Sept. 28 with an eight-session course on "Successful Management of an Appliance Business," open to owners and managers; will follow up with classes on sales training and personal development, open to the entire industry.

Another bureau project is a series of electric range cooking schools to be carried on in 15 San Diego County communities. Committee working on the promotion is headed by E. W. Weise, chairman of the bureau's electric range and water heater promotion committee, and includes all distributor and manufacturer representatives of the electric ranges and water heaters sold in San Diego territory.

Association of Appliance Dealers, Seattle, started its fall season with a new plan—will select a different chairman for each meeting and will assign all association work to committees. First noon meeting on Sept. 15, under chairmon Hal Soden, was held at the Gowman Hotel. Speaker was Rex L. Allison, president of the Bon Marche.

IEEDA

"Five-Minute Poll" conducted by the Inland Empire Electrical Dealers Assn. indicated that members felt freezer sales were unsatisfactory in that area—though action was needed to increase sales. So IEEDA is busy making plans to give freezer sales the desired boost. First promotion—an October public meeting on the use of freezers and methods of preparing food for freezing. Meeting will be conducted by the association's Consumer Bureau. In preparation one housewife member of the Consumer Bureau has been making home tests of foods that can be frozen and getting freezer information to report at the meeting, which will be publicized among members of the women's clubs affiliated with the Spokane Federation of Women's Organizations.



BE SURE OF YOUR CIRCUITS UNDER TOUGHEST CONDITIONS —FOR INSTANCE, UNDER BAKING HEAT

This open steel mill soaking pit presents just about the best example of the worst conditions wire and cable have to work under. Power and control circuits are exposed to the blasts of white-hot heat from the pits and suspended billets—that's why they are wired with *permanently insulated* Rockbestos A.V.C.

Your maintenance-boosting circuits may not have to take such severe conditions, but you'll protect operations and save worry and work when you wire the hot spots with Rockbestos A.V.C. wires, cables and cords. Impregnated asbestos braid and felted asbestos insulation are the answer to wiring problems. Their inherent heat and flame resistance makes Rockbestos A.V.C. wires and cables *permanently dependable.*

Wherever heat and moisture, grease, oil or corrosive fumes may cause wire-failure—wire with Rockbestos A.V.C. and *insure* service.

WRITE TODAY—for your copy of the new No. 10-F Catalog, sectioned for easy reference to permanently insulated Lighting Wires, Power & Control Cables; Apparatus Wires & Cables; Switchboard, Fixture, Electronic and Magnet Wires.

ROCKBESTOS PRODUCTS CORP.
242 Nicoll St., New Haven 4, Conn.
Office and Warehouse, Oakland Municipal Airport, Oakland, Calif.
Los Angeles District Office, 6919 San Fernando Rd., Glendale, Calif.

ROCKBESTOS

THE WIRE WITH PERMANENT INSULATION

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

PLASTIC SLEEVES
For hydraulic tubing - Printed to A-N specifications. Used by aircraft, household appliance, radio manufacturers, and metal and wire industries. A new, exclusive Topflight item.
TOPFLIGHT TAPE CO. YORK PA.

Spokane Chapter, IEEDA, elected a new director, W. J. Maghan, General Appliance Co., Spokane.

Coeur d'Alene Chapter played host at a big social gathering for members and guests of IEEDA on Sept. 22 at Hayden Lake, Idaho.

IEA

Intermountain Electrical Assn., Salt Lake City, held its 25th annual outing at Lagoon, with a record crowd of 2,688 attending.

● Joe Wright, former lighting salesman for Public Service Co. of Colorado and more recently in charge of the Go All-Electric Program of the Rocky Mountain Electrical League, has become affiliated with the Afton-Lemp Electrical Co., electrical wholesaling house at Boise, Idaho. His place at the RMEL is being taken by William J. Borke, former salesman for Public Service Co. of Colorado, recently returned from the Army, a major, after having enlisted as a private. He is carrying on the Go All-Electric promotion campaign in the RMEL territory.

AIEE

E. S. Lee, president of the American Institute of Electrical Engineers, was guest of honor at the inaugural meeting of the Richland, Wash., section of the Institute Aug. 23. The new section, first to be established in the Northwest since 1939, started with more than 70 charter members. Bulk of the members are connected with the Hanford-directed operations of the Atomic Energy Commission.

Preceding the inaugural dinner a small party of AIEE officers and members were taken on a conducted tour of construction areas of the Hanford Works. Following the dinner, section officers were installed by O. W. Hurd, vice-president of the Ninth District of the AIEE.

In welcoming the section to the Institute, President Lee emphasized the value of full participation in Institute activities. He also stressed the need for greater participation by the engineer in community activities outside the field of engineering.

Officers of the new section are H. R. Hughes, chairman; W. J. Dowis, vice-chairman, and J. H. Hemperly, secretary-treasurer.

Following the Richland meeting, Lee attended the Pacific General Meeting in Spokane, as reported elsewhere in this issue. He then visited the Vancouver, B. C., section Aug. 30, Seattle Aug. 31 and Portland Sept. 1 before returning to his work as chief engineer of General Electric's general engineering and consulting laboratory in Schenectady.

● Professor L. M. K. Boelter, dean of the college of engineering at the University of California, Los Angeles, has been named a Fellow of the Illuminating Engineering Society.

● Karl Spangenberg, Stanford University, a member of the Institute of Radio Engineers, has been elected to the grade of Fellow by the Board of Directors of the Institute.

Get the BIG THREE of Motor Performance with MULTIFLEX BRUSHES

U. S. Pat. 2,181,076

1. IMPROVED COMMUTATION
2. MORE UNIFORM WEAR
3. LOWER OPERATING COSTS

When you install Helwig-Speer MULTIFLEX Brushes on your rotating equipment, you're taking advantage of advanced engineering. For MULTIFLEX Brushes give you uninterrupted, better contact . . . reduced vibration . . . lower circulating current . . . even wear.

The result: *superior performance at lower cost.*

And you also get all the advantages of double brushes with single-brush simplicity . . . without special adapters or changes in equipment. MULTIFLEX brushes slide right into conventional single-brush holders. Catalog 25 gives you all the facts on ordering brushes. Write for your copy today.

★ CALL YOUR NEAREST OFFICE

A handy way to stock brushes
— There's a Helwig Brush Kit for every purpose. For example, Kit No. 10 contains brushes, springs and wicks for 175 types of vacuum cleaners. You don't have to order a complete kit if you run low on a popular brush. Simply consult Bulletin 65 and request the number you need from the Helwig office nearest you.

PACIFIC COAST OFFICES
San Francisco.....Pier 3, Exbrook 2-8820
Seattle.....166 Jackson St.; Elliot 7133
Portland....711 NW Everett St.; Beacon 3368
Los Angeles..611 W. Pico Blvd.; Prospect 8381
Denver.....1644 Blake St.; Cherry 4425
Salt Lake City.....524 E. St.; Tel: 3-1600

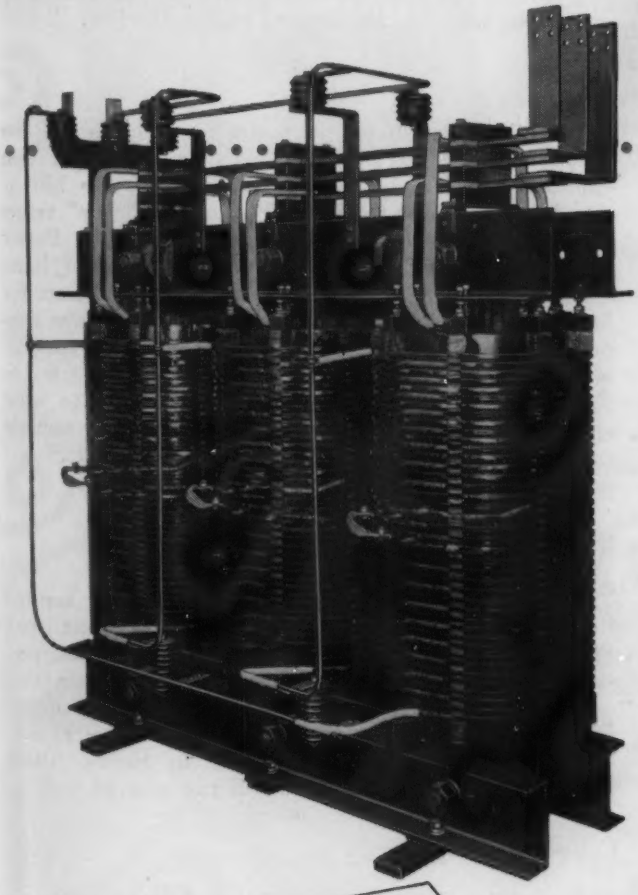
HELWIG SPEER

HELWIG CO., CARBON PRODUCTS
Makers of Multiflex and Transert Brushes

Wagner Dry-Type Indoor Transformers

Now available in ratings from 100 to 2000 kva

To meet industry's growing need for larger indoor dry-type load center transformers, Wagner has broadened its line of three-phase dry-type transformers to include ratings up to 2000-kva in the 15-kv class and below. Especially developed for plant power distribution circuits, these units are compactly housed in neat, attractive enclosures, which can be arranged to include primary and secondary switchgear compartments to form readily accessible, closely-coupled unit substations. Complete enclosure of all equipment protects against accidental contact with live parts. Relatively light in weight, so that they can be used in multi-story buildings, they are readily adaptable to any installation requirement.



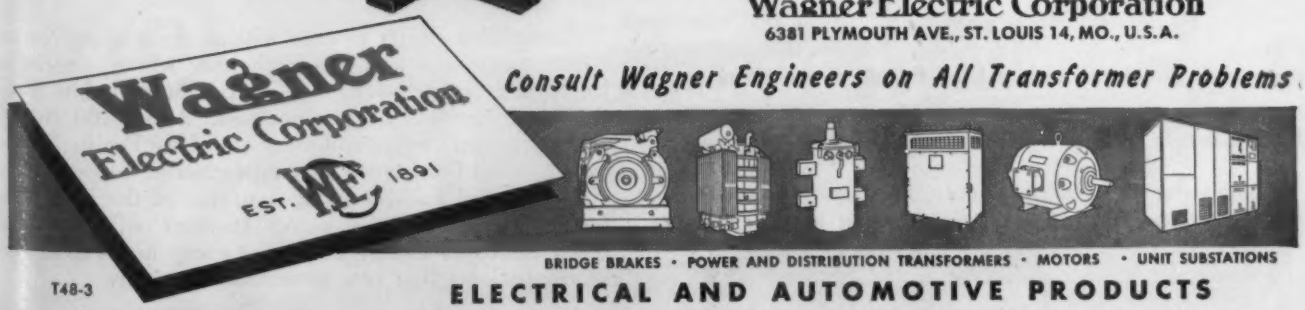
More than fifty years of transformer building experience has been incorporated in the design and construction of these transformers. The coil conductors are insulated with double servings of fiber glass. The windings are insulated from each other and from the core and mechanical parts using Class B and Class C materials, the latter being employed where extra strength is required. The core is sturdily constructed, and both the core and the coil stacks are provided with vertical ducts for effective cooling. The entire core and coil assembly is given successive baked coats of heat resistant synthetic varnish which produces a tough, high gloss finish. The connections between phases and to the switch gear are securely braced and well insulated from each other and from ground, and the conducting surfaces of all clamped joints are silver plated to prevent corrosion.

Transformers can be furnished with equipment for indicating winding temperature. Fans for increasing the capacity 25% may also be provided when the possibility of load growth warrants this addition.

Bulletin TU-56 describes in detail the transformers, the enclosures, the various types of incoming line sections available, and the optional equipment and accessories that can be furnished. Write for your copy today.

Wagner Electric Corporation
6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

Consult Wagner Engineers on All Transformer Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

T48-3

ELECTRICAL AND AUTOMOTIVE PRODUCTS

THE MONTH IN BRIEF

McLaughlin Says Dirty Pool

"Bonneville's recent astonishing action in giving the Snohomish County PUD a long-term prime power contract for 50,000 kw., before the district was even in the power business, was to enable the PUD to go ahead with the condemnation of company facilities," says Frank McLaughlin, president of Puget Sound Power & Light Co. "It seems to me that it is a matter for congressional inquiry when Bonneville fosters, aids and abets piecemeal condemnation of private utility property especially when in so doing it unfairly discriminates against those who are trying to work out a constructive solution of the serious power problem."

"Absolutely Ridiculous"

McLaughlin branded the $8,000,000 price set forth in the condemnation action as "absolutely ridiculous" and indicating "a confiscatory approach." He pointed out that a previous condemnation proceeding in 1943 resulted in an award of $9,500,000, and declared there has been a tremendous expansion of the company's operations in the county since that time, while at the same time the cost of labor and materials has practically doubled.

First Break

Condemnation proceedings by the Snohomish County PUD to acquire Puget's distribution system marks the first break in a program under which various PUDs throughout the state of Washington have been buying distribution systems from the company at negotiated prices. Chelan PUD bought the Chelan, Douglas and Grant counties for $8,000,000 and other PUDs bought the Mason and Cowlitz county properties. A deal for the Grays Harbor system was completed recently.

In the Meantime

Valuation work is proceeding to fix a price for distribution facilities of the Puget Sound Power & Light Co. in Seattle, its Rock Island power plant on the Columbia and its White River plant as basis for trying to effect a negotiated sale to Seattle City Light. Figures should be in by late September or early October. If City Light makes a deal, the Seattle City Council may get cold feet and submit the whole thing to the voters. If that happens, some of the politically astute up in that region say the proposition will be beaten. People of Seattle are said to be leery of buying "junk" since the "Ole Hanson deal" under which Seattle bought the power company's street car system back during World War I.

King County Wants PUD

Commissioners of King County, the county in which Seattle is located, are considering putting a PUD proposal on the Nov. 2 ballot in response to petitioners. If formed, the PUD would serve all the rural areas outside Seattle. This would include, Mercer Island, Vashon Island, the cities of Renton, Black Diamond, Auburn, Kent, Bellevue, Kirkland, Redmond, Bothell and Des Moines. McLaughlin of Puget Sound says he will oppose the move on the grounds that piecemeal condemnation of an integrated system is basically destructive and economically unsound.

Reno Wants Shasta Power Contract

City officials of Reno are in a dither over their "power problem." They want some kind of guarantee against another possible power shortage that would give them a brown-out like the one experienced early this year in common with northern California, where most of Reno's power comes from. They plan to retain priority to 90,000 kw. of Shasta Dam power which was reserved last year by Nevada's Colorado River Commission in an agreement with the Department of the Interior.

But—

There is no way to get the power from Shasta to Reno at present. Nevada's Senator Malone says "get that contract signed and I will get a line over the hill or they'll carry it over the hill." Presumably "they" refers to PG and E, who wholesales to Sierra Pacific Power Co., serving Reno and vicinity. City Council of Reno is said to be urged by USBR to enter into a contract for 5,000 kw. of Shasta power (the amount Reno was supposed to have been short in the brownout last spring) so Interior can use this as a basis for a suit to try to force PG and E to "wheel." Interior is said to want another suit against PG and E besides the government suit now pending to compel the utility to wheel Shasta power for Navy installations.

Denies Shortage Possibility

Frank Tracy, president of Sierra Pacific, has assured Reno that his recent long-term power contract with PG and E and his expansion program are the best possible protection for an adequate power supply that can be obtained. PG and E is now clearing right-of-way for a third transmission line to Donner Summit to connect with a 110-kv. line to be built by Sierra. Other facilities to be added by Sierra will run over $4 million.

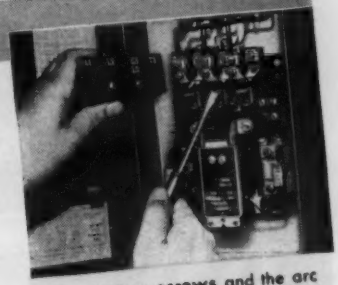
Cooperative Spirit

Cooperative efforts to cope with an impending Northwest power shortage this fall and winter continue. Immediate organization of a joint industry-public utilities committee has been announced. About 100 Northwest industrial leaders and members of the Pacific Northwest Utilities Conference Committee met in Tacoma Sept. 10, and heard C. A. Erdahl, chairman of the joint conference, warn that the power shortage will probably reach 2,000,000 kw. by 1956. The group hopes to devise means for speeding new generating capacity.

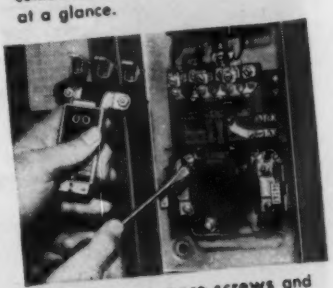
GET COMBINATION STARTER ADVANTAGES PLUS ACCESSIBILITY

COMBINATION STARTERS are increasing in popularity because they are safe, easy to install, take less space and have good appearance.

In addition to these advantages, Square D Combination Starters, with either front-operated switches or Thermal-Magnetic (Coilless) circuit breakers, feature magnetic starters that are accessible.



Loosen two screws and the arc chamber cover comes off. Every contact surface can be inspected at a glance.

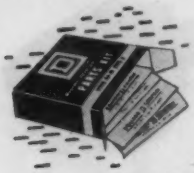


Remove two more screws and entire armature and movable contact assembly can be lifted off. Disconnect two wires from screw-type terminals and slip off magnet coil.

Contacts are attached with separate screws—can be removed and replaced without disturbing any wiring. Screw-driver is only tool needed.

Even the *BEST* Motor Starters Need Inspection and Maintenance

ALL starters require periodic contact replacement under conditions of heavy load or frequent operation. Some may require magnet coil exchange to match voltage and frequency of power supply. That's why Square D has always stressed accessibility—simplifying installation, inspection and normal maintenance.



New "Off-the-Shelf" Parts Kits make normal maintenance easier than ever!

Now, replacement parts for Square D starters are packaged in easy-to-stock kits. Each kit contains parts necessary to replace all load contacts on two or three-pole starters. Parts are individually packaged in clearly labeled envelopes. Illustrated service bulletin is enclosed for quick parts identification and complete installation instructions.

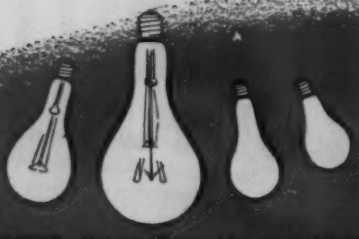
Write **for Combination Starter Bulletin 8538 and Parts Kit Bulletin 9998. Square D Company, 4335 Valley Blvd., Los Angeles 32, California,**

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

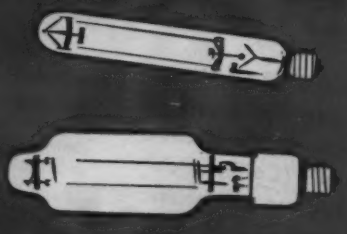
SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

WESTINGHOUSE LAMPS

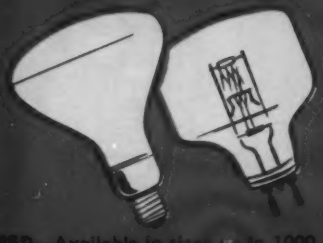


INCANDESCENT—Universally used for general lighting jobs. Westinghouse incandescent lamps are offered in sizes of 3 to 1500 watts with frosted, clear, or colored finishes.

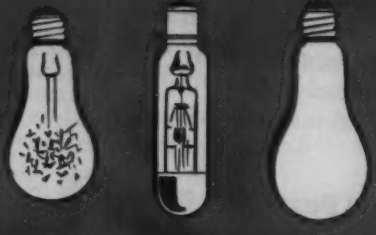
FLUORESCENT—Westinghouse high-quality fluorescent lamps are available in all sizes from 6 to 100 watts in white, daylight, soft white, and 4500 deg. white. Westinghouse slimline lamps are made in lengths from 42 to 96 inches. *For more information, write for 24-page booklet, Form A-4758.*



MERCURY VAPOR—Westinghouse, the foremost manufacturer of mercury vapor lamps, makes sizes of 100 to 3000 watts for general lighting, floodlighting, street lighting, photochemical, photographic, and searchlight service. *For more information, write for 24-page booklet, Form A-5112.*



INFRARED—Available in sizes up to 1000 watts, Westinghouse infrared lamps are proving to be the simple, convenient, and economical source of heat for many baking, drying, and heating processes today. *For more information, write for 16-page booklet, Form A-3817.*



PHOTOGRAPHIC AND PROJECTION—High-quality Westinghouse flood, flash, enlarger, projection, and sound-reproducing lamps are available in all sizes for general and special applications. *For more information, write for 20-page booklet, Form A-4754.*

STERILAMPS*—Sterilamps, the Westinghouse germicidal lamps, are available with ratings from 4 to 30 watts. Only Westinghouse also offers the new slimline germicidal Sterilamp with new high intensity that cuts cost of protection in half.

*Reg. U. S. Pat. Off.

Westinghouse Lamps

PLANTS IN 25 CITIES · OFFICES EVERYWHERE

WESTINGHOUSE LAMP DISTRICT OFFICES: 10 High St., BOSTON; 2480 Peachtree Rd., CHAMBLEE, GA.; 20 N. Wacker Drive, CHICAGO; 40 Wall St., NEW YORK; 3001 Walnut St., PHILADELPHIA; 419 Wood St., PITTSBURGH; 410 Bush St., SAN FRANCISCO; 411 N. 7th St., ST. LOUIS.

Planned Industrial Lighting

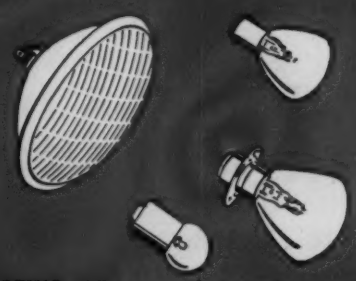
The lamps you use are the key to the effectiveness and efficiency of your lighting system. When you use Westinghouse lamps you are assured of having the best lamps that modern engineering, manufacturing, and production methods can produce.

The right light for every industrial purpose. With 10,000 types and sizes of Westinghouse lamps to choose from, you can be sure of getting the right light for your purpose. A total of 486 tests and inspections from raw material to finished product assures you that every Westinghouse lamp you buy is of uniform high quality. Thousands of industrial users choose Westinghouse lamps for these reasons:

High light output
High light output maintained throughout life
Uniform performance
Lamps made to close dimensional standards
All types of lamps
Lamps embody all the latest improvements

Next time you buy lamps, specify Westinghouse—and get the most out of your lighting system. For complete product information, call your Westinghouse Lamp representative or write the nearest Westinghouse Lamp District Office.

SPECIAL SERVICE—Rough- and vibration-service lamps in 50- and 100-watt sizes are specially constructed to give long, satisfactory performance in punishing applications. High-voltage service lamps in sizes from 25 to 1000 watts are designed for use at 230 and 250 volts.



AUTOMOTIVE—All types and sizes of automotive lamps are available for cars, trucks, buses and tractors. Types include sealed-beam headlights, prefocused lamps, tail lights, panel lights, interior lights, and indicator lights.

SEND FOR FREE BOOKLETS

Check and mail the coupon today for your copies of this helpful information. Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J.

Westinghouse Electric Corp.
Lamp Division, Bloomfield, N. J.

Please send me the free booklets I have checked below:

.....Fluorescent (A-4759) **.....Infrared (A-3817)**
.....Mercury Vapor (A-5112) **.....Photographic (A-4754)**

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ **ZONE**_____ **STATE**_____

EW-10

FLAT
Contact Surfaces
Catalog Bulletins on Sherman Soldering Lugs available upon request.
We put a lot of careful workmanship into the production of all Sherman Soldering Lugs. Dimensions are held to consistent accuracy. Lugs are kept free from burrs, corrosion, etc., and special attention is devoted to maintaining FLAT contact surfaces. All lugs individually inspected before shipment.
H. B. SHERMAN MFG. CO.
Battle Creek, Mich.
Sherman
SOLDERING LUGS

ANOTHER STEP IN THE PROGRESS AND GROWTH OF VICTOR ..OUR NEW MODERN KILN NO 3
For DEPENDABLE Insulators
Specify VICTOR
High tension porcelain insulators made at Victor have passed the most *severe* tests on countless types of installations during the past 50 years. For safety, service and satisfaction, specify "Victor" We are doing our utmost to maintain dependable deliveries
LOOK FOR THIS SYMBOL OF QUALITY
V
VICTOR INSULATORS, Inc., Victor, N.Y.
BIRTHPLACE OF FIRST WET PROCESS HIGH-VOLTAGE INSULATORS

THIS MONTH'S NEWS

City Proposes Bond Issue To Buy Out Power Company

Deferring until Nov. 9 the second reading of an ordinance to authorize a $941,000 bond issue to buy distribution facilities of California Electric Power Co., the Corona, Calif., city council agreed to select a citizens committee to study the proposal.

Corona City Clerk Harry L. Lyman states that the money from the bonds will be used to purchase all light, heat, and power distribution facilities and two infeeder transmission lines from Southern California Edison and California Electric.

Corona population is estimated at 10,400 with assessed valuation of more than $9 million. Current city county tax rate is $6.25.

California Electric Power Co. officials have said that the Corona properties are not for sale, and it is believed that condemnation proceedings will be instituted if Corona voters approve the bonds.

Edwin Fleischmann, San Francisco, made a survey of the properties for the city of Corona.

Grays Harbor PUD Acquires Puget Power Properties

Grays Harbor properties of Puget Sound Power & Light Co. have been sold to Grays Harbor PUD for $1,024,000 plus the value of accounts receivable, Utility President Frank McLaughlin announced last month. McLaughlin said that the Grays Harbor transaction was about the last of the "fringe" properties that he had previously indicated were for sale separately.

He indicated that most of the remaining properties will be considered in two groups for future sales transactions — (1) the Seattle distribution system plus the Rock Island generating plant, and (2) the remaining distribution and generating systems. The remaining properties in areas where PUDs have been established in western Washington constitute a closely knit economic interconnected system and peacemeal dismemberment would involve substantial severance and operating difficulties, he said.

Of the money received from sale of properties, $10,000,000 is being used to retire bank loans.

ONE of the outstanding developments introduced by Sylvania is complete packages of Fluorescent Light, including fixtures, lamps, starters and lampholders all made by Sylvania.

This means that every fixture and all its component parts are backed up by one manufacturer to guarantee unsurpassed quality.

Sylvania has pioneered many other developments of prime importance in the fields of Lighting, Radio, FM, Television and Electronics.

ALL PRODUCTS MADE BY SYLVANIA ELECTRIC CONSUME ENERGY—MORE THAN 10,400,000,000 KWH PER YEAR

SYLVANIA ELECTRIC

WEST COAST DIVISION OFFICES: LOS ANGELES, SAN FRANCISCO, SEATTLE

R&S
HEAVY DUTY
RECEPTACLES
AND PLUGS
Many unique built-in features insure adequate safety factors, assure low maintenance, and allow ease of installation.
The high degree of standardization and interchangeability of parts provide a wide variety of types and sizes to meet every requirement.
Ratings from 30 to 400 amps., 250 and 600 volts.
ANGLE TYPE
VAPORTIGHT
WATERTIGHT
AND
EXPLOSION-
PROOF
69
Sold Through Electrical Wholesalers
SALES OFFICES IN PRINCIPAL CITIES
Write on your letterhead, please, for latest catalog.
RUSSELL & STOLL COMPANY, INC.
Precision-Built Electrical Equipment
125 BARCLAY STREET, NEW YORK 7, N. Y.
SINCE 1907

TOWNS OPPOSE INCLUSION IN KING COUNTY PUD

Opposition to including the towns of Renton, Kirkland, Redmond and other east side towns near Seattle in the proposed King County PUD has been expressed.

The city of Renton, which leads the protest, has passed a resolution declaring that existing electrical service within the city (furnished by Puget Sound Power & Light Co.) is adequate and advantageous. Mayor Perry Mitchell has pointed out that the power company pays 40% of property taxes within the city limits of Renton. Advocates of the PUD claim the revenue will be replaced by a 3% tax on revenues.

In addition to its other installations, Puget Power owns the Shuffleton steam plant within the Renton city limits. This plant has a valuation of more than $1,500,000.

"No one knows definitely how much revenue the PUD would return to the city," Mayor Mitchell said. "The private power company has given us assurance that we would have the first opportunity to buy the company distribution facilities should they later wish to sell. We have everything to gain and nothing to lose."

● PLANS for giving publicity to the report by two engineering firms on their survey of the Seattle City Light-Puget Sound Power & Light Co. merger, cover presentation of the plans to the Seattle board of public works before it is given city council consideration. It has also been agreed to print 2,000 copies of the report, which will be sold to the public for a price somewhat less than the estimated cost, $3.75 a copy. The survey, which started Jan. 15, and was expected to cost about $60,000, will probably cost more than $100,000, and will become the basis for negotiations with the Puget Sound Power & Light Co. for purchase by City Light of its properties in the Seattle competitive area.

● TRANSFORMERS removed from the Salem, Ore., aluminum plant have been installed in the Eugene, Ore., substation of the Bonneville Power Administration. The new transformers will permit delivery of about 8,000 kw. of additional energy to Eugene and will give the Eugene utility system a peak supply of 40,000 kw., sufficient to insure against the possibility of a brownout during the coming winter. Last February the Eugene system recorded an all-time record demand of 32,000 kw.

Look what General Electric is doing to boost

SUN AND HEAT LAMP SALES in the area you serve

1. DISPLAYS

Real profit boosters that put a sales punch into windows and counters. Several types and sizes to meet every need.

PLUS counter literature and handouts—complete sales talks in print.

2. NATIONAL ADVERTISING

Leads off with color pages in some of America's most popular magazines. Hits prospects with a series of follow-up ads!

PLUS plenty of ad mats and good, newsy publicity stories for local use.

3. NETWORK RADIO

Carries the story of G-E Sun and Heat Lamps to millions of listeners, with General Electric Lamp's sparkling quiz show "What's My Name?", starring Arlene Francis. Every Saturday night on the ABC network.

4. LOW PRICES

G-E SUNLAMP—*NEW LOW PRICE*—
formerly $9.95 . . . . . *now only* **$8.50**

G-E HEAT LAMP

Hardglass model with red filter . . . **$2.95**

Standard model . . . **$1.10**

G-E LAMPS

GENERAL ELECTRIC

Two-Way
PROTECTION

with

IDEAL VOLTAGE TESTER

You can't miss with *this* voltage tester! It has a solenoid voltage indicator and a neon test lamp. BOTH indicate relative voltage values—EITHER will function if the other fails. The Ideal Voltage Tester is *not* an ordinary "glo" type; it actually shows the nominal line voltage on an easy-to-read, calibrated scale. Numbers on scale are colored to correspond with fuse label color code. Tests AC circuits, 110 to 550 volts — DC circuits, 110 to 600 volts . . . blown fuses . . . grounds . . . frequency . . . DC polarity. Handy size, sturdily constructed; complete with leatherette carrying case.

FISH TAPE, REEL AND PULLER

3 Tools in 1. Gives complete control of fish tape . . . keeps it reeled up . . . prevents springing and breaking . . . helps workmen avoid "live" parts. Makes it easy to pull tape through conduit. Gives a big grip. No slipping. Tape is easy to reel in or pay out. 5 sizes.

"SAFE-T-GRIP" FUSE PULLER

No slip! Formed to fit fingers; assures positive, full grip. Safe, handy, inexpensive. Eliminates danger, prevents bending of fuse clips. Three sizes; many uses.

"E-Z" HAND TYPE STRIPPER AND CUTTER

For solid or stranded wire. Always ready—no cocking. Triple Action . . . clamps wire, cuts insulation, strips —all in one operation. Eliminates wire waste. Made in two models. "Automatic" has lever to stop return of arms till stripped wire is removed.

IDEAL INDUSTRIES, Inc., Sycamore, Ill.

IDEAL

Distributed Through
AMERICA'S LEADING WHOLESALERS

IBEW CONVENTION URGES COLUMBIA RIVER DAMS

Two resolutions urging Congress to authorize immediate construction of all proposed dams on the Columbia River and its tributaries and to develop the Columbia River power sites were adopted without discussion by the 23rd convention of the International Brotherhood of Electrical Workers, AFL at Atlantic City.

The 2,500 delegates refused to pass, but referred to the union president, Dan W. Tracy, for his consideration, resolutions urging a 30-hour week for all IBEW members and vacations and holidays with pay for electricians employed in the building trades.

The paid vacations and holidays resolution was submitted by Local Union 595 in Oakland, Calif., one of whose delegates told how it had negotiated in 1947 the first paid vacations contract in the IBEW for inside wiremen, only to lose it later.

The committee which recommended the convention action on vacations and the 30-hour week pointed out that paid vacations are impractical because of the irregularity of construction employment and that the shorter work week would have to wait until economic conditions permitted it.

One of the Columbia River resolutions was put in jointly by locals in Portland, Spokane, Seattle and Wenatchee, Wash. It called attention to the floods and power shortage, which it said is keeping new industries out of the Northwest.

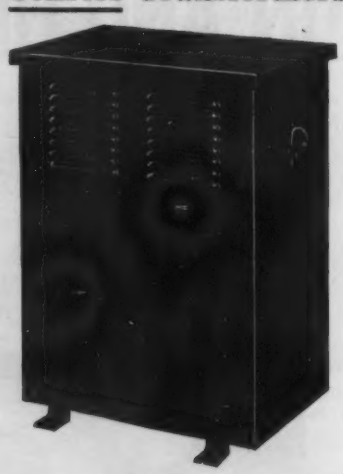
The other, introduced by the Portland local, urged Congress to develop the power sites and appropriate ample funds "for erection of transmission lines and substations to permit the decentralization of electro industries throughout the entire Northwest region." The convention deleted from the resolution a provision that copies of it be sent by local unions to their congressmen and senators and to the presidential candidates.

Literature was distributed to the delegates on the Columbia River development, Bonneville Dam and the Willamette Valley project.

The convention defeated a proposed constitutional amendment which would have created another district covering Alaska, Washington, Oregon and Idaho. Alaska, Washington and Oregon are part of the Pacific Coast district which includes California, Nevada and the Pacific Islands. Idaho is part of another district. The proposed change was suggested by the local union at Bremerton, Wash.

ECONOMICAL

Jeffries Transformers



Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles 11, Calif.

H. H. Van Luven

307-09 East Third Street
Los Angeles 13, California
MUtual 5173

Manufacturers' Representative

Representing

CONNECTICUT TELEPHONE & ELECTRIC DIVISION
Hospital Signal Systems — Annunciators — Intercommunication equipment, etc.

DONGAN ELECTRIC MANUFACTURING CO., Inc.
Neon—Signal—Control and Power Transformers.

LENZ ELECTRIC MFG. CO.
Lead—Braid Covered Cables and Wires—Tinsel and Copper Cordage—Special Cables

SIGNAL ENGINEERING & MFG. CO.
Relays—Bells—Horns—Code Call Systems—Fire Alarm Systems

HART MANUFACTURING COMPANY
Remote Control Equipment — Switches — Relays — Thermostats

HAZARD-OKONITE COMPANY
Copperweld, Bronze, Copper, Telephone Wire Division

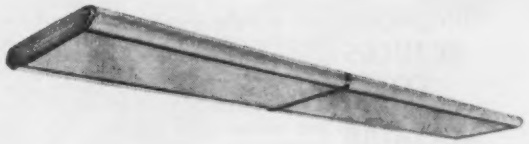
TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

BURKE ELECTRIC COMPANY
Bakelite Controlead Terminal Blocks

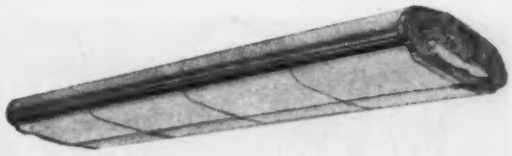
SUNBEAM *is lighting the West!*

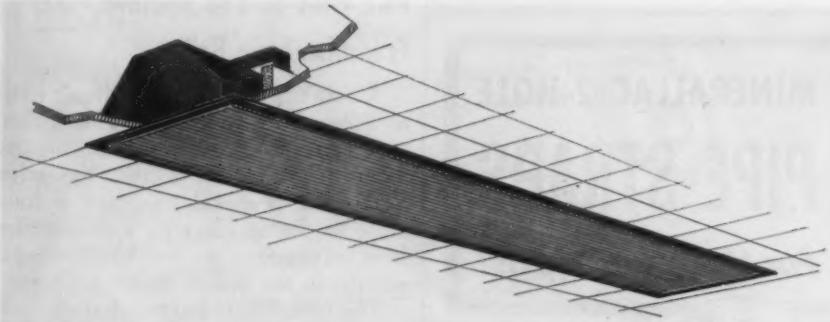
IN LOS ANGELES The General Petroleum Building is illuminated by this Sunbeam fixture.

IN SAN FRANCISCO The Schlage Lock Company chose this Sunbeam fixture for their new building.



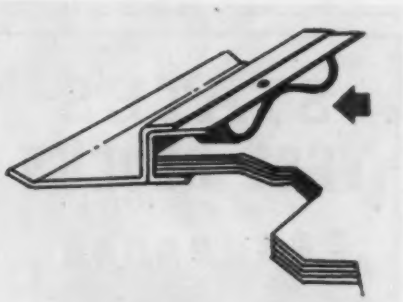
IN WESTWOOD The new U.C.L.A. Library will be scientifically lighted by this Sunbeam fixture.



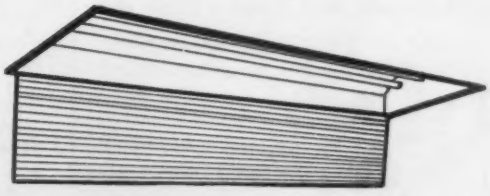


IN PORTLAND The Lincoln Building was comfortably modernized. This Sunbeam fixture No. 903-48, a deep troffer recessed unit, was specified for installation. About 2,000 fixtures; some single units, others in continuous runs, will afford excellent light distribution throughout.

These are only a few of the many recent Sunbeam installations. These are only a few of the many fixtures in the Sunbeam line.



Exclusive Sunbeam "light guard" spring clips which eliminate all light leaks between glass and frame.



Glass support frame swings down on full length piano hinge for easy maintenance.

SUNBEAM

LIGHTING COMPANY

All Sunbeam Fixtures Sold Only Through Leading Electrical Distributors
777 East 14th Place • Los Angeles 21, California

THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.

MAIN PLANT Newark 2, N. J.

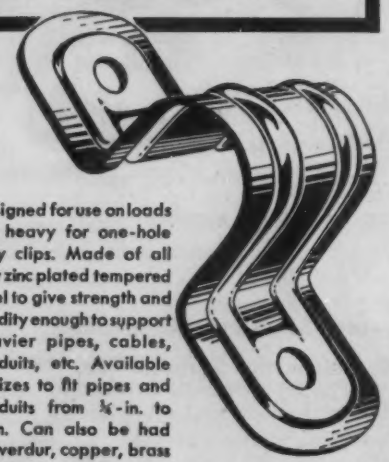
STATES
TEST BLOCKS

Make testing of meters and relays safe and quick. They cut costs by simplifying test connections. Available in a variety of combinations for front or back connection.

Ask us also for information on test tables, loading devices, phase shifters, terminal blocks and accessories.

GEORGE E. HONN CO.
420 MARKET ST.
SAN FRANCISCO, CALIF.
PHONE SUTTER 1-7352

MINERALLAC 2-HOLE
PIPE STRAPS
For Heavier Loads!



Designed for use on loads too heavy for one-hole Jiffy clips. Made of all new zinc plated tempered steel to give strength and rigidity enough to support heavier pipes, cables, conduits, etc. Available in sizes to fit pipes and conduits from ½-in. to 1-in. Can also be had in Everdur, copper, brass or aluminum.

Send for literature and prices

Specify MINERALLAC HANGERS, CLIPS, STRAPS, BUSHINGS

MINERALLAC ELECTRIC COMPANY
23 N. Peoria St., Chicago 7, Illinois

MINERALLAC

POWER COMPANY NEGOTIATES FOR BEARDSLEY DAM POWER

Pacific Gas & Electric Co. is negotiating with two irrigation districts for the output of a proposed hydroelectric development on the middle fork of California's Stanislaus River.

Oakdale Irrigation District and South San Joaquin Irrigation District have asked the Federal Power Commission for a license for the proposed Beardsley Dam and power plant. The project will be located upstream from PG and E's Stanislaus plant. It will include a 13,500-hp. generating plant, a switchyard and other power facilities.

The irrigation districts plan a rockfill dam with a maximum height of 275 ft., and a reservoir with a surface area of 720 acres and capacity of 97,500 acre-ft. Total cost of the project is estimated at $8,840,000.

Primary purpose of the project, according to the application filed with FPC, is to supply irrigation water for San Joaquin Valley farms served by the two districts. Arrangements are being made to dispose of the incidental power output with PG and E, it was reported.

PGE Files Suit to Remove Franchise from Ballot

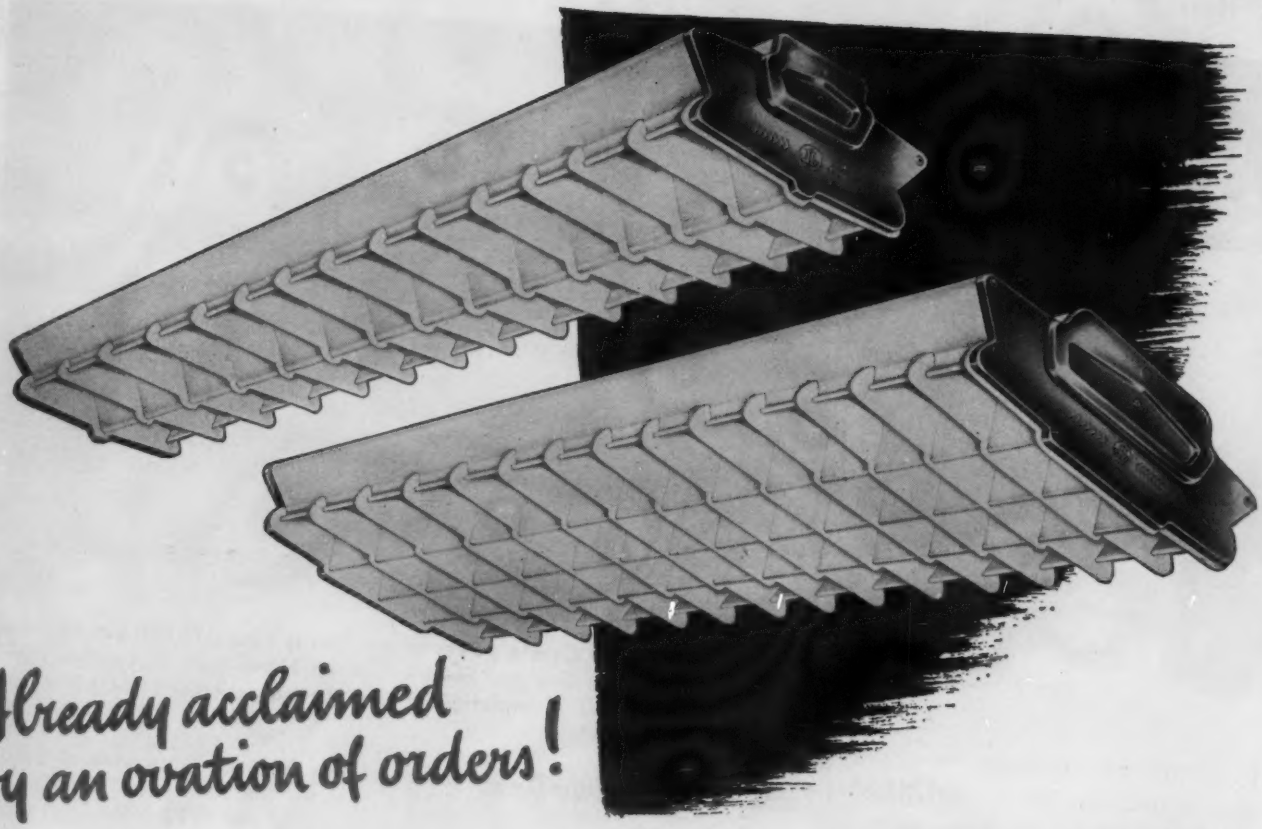
A suit has been filed in circuit court at Salem, Ore., by the Portland General Electric Co. to remove from the Salem city ballot at the November election a proposal to grant a franchise to Salem Electric, a cooperative now providing a restricted electric service in the Salem area.

The complaint charges that the proposed franchise would discriminate against PGE and that the wording of the ballot title is misleading.

Salem Electric operates in a portion of the business section of Salem on a permit basis. In two previous elections voters of Salem have rejected proposals to grant the co-op a general city franchise.

● SEATTLE CITY COUNCIL has accepted the $5,905,740 bid of Blair & Co. and Associates, New York, for the purchase of $6,000,000 City Light 2¾% bonds to finance construction of improvements in the city's power and light system.

● CONTRACT has been awarded to C. H. E. Williams Co., Ltd., Vancouver, B. C., for the installation of ornamental street lighting on Davie, Denman and Robson streets in Vancouver. The contract is valued at $100,000.



Already acclaimed by an ovation of orders!

THESE NEW TWIN TRIUMPHS OF PRECISION-PLANNED LIGHTING:

LENOX-2*
LENOX-4*

And no wonder! After two years of exhaustive research, Day-Brite has engineered into these superb fixtures all the features you want *most*.

Greater efficiency . . . more ease and economy of installation and maintenance . . . smarter functional styling . . . added flexibility of application . . .

they're **all** yours in the versatile LENOX-2 and LENOX-4.

HIGHLIGHTS OF THE NEW LENOX "TWINS":

- Two 40-watt lamps (LENOX-2) or four 40-watt lamps (LENOX-4) in matching fixtures engineered for low brightness ratios . . . easier-than-ever vision.
- Ceiling or suspension mounting . . . singly or in continuous runs.
- Rugged, rigid *all-steel* precision-built construction.

Send today for the complete LENOX story, including detailed installation and performance data.

409

IT'S EASY TO SEE WHEN IT'S

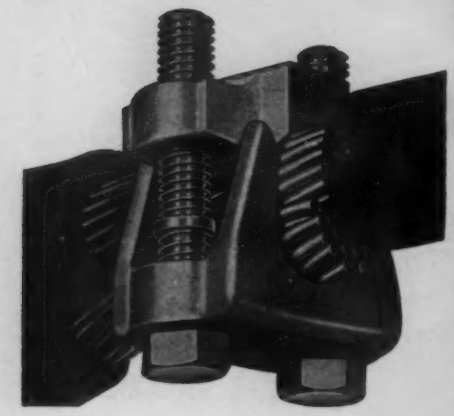
DAY-BRITE *Lighting*

*T. M. Reg. U. S. Pat. Off., Patents Pending

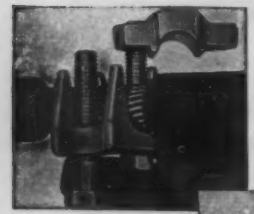
Day-Brite Lighting, Inc., 5412 Bulwer Avenue, St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.

In Canada:
Address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario

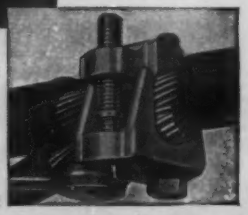
MATTHEWS
UNICLAMP
CONNECTORS



Made for use on copper or aluminum wires from 2/0 to 1000 MCM inclusive. They will connect two wires of their rated size or one wire of their rated size with one or more smaller tap-off wires down to No. 8 solid. They have many advantages over the larger sizes of connectors of the split bolt and other designs as they provide greater pressure between wires, hence greater holding power, are less costly, are easier to install and the assembled design is such that parts cannot become separated.



Fit on conductor as shown. Position top member and partially thread in free bolt.



Insert tap wire and equally draw up both bolts.

Write for Bulletin 206

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

Construction scene at Cresta power house. This is a new 75,000-kva hydro plant being built by Pacific Gas and Electric Co. on North Fork of Feather River at a cost of $26,400,000. Completion of this plant is scheduled for winter of '49

Tacoma Planning Two Dams On Cowlitz River

The City of Tacoma has announced plans to build two hydroelectric projects on Washington's Cowlitz River with a total installed capacity of 345,000 kw.

The projects will be located near the towns of Mossyrock and Mayfield, in Lewis County. The Light Division of the city's Department of Public Utilities filed a declaration of intent to erect the projects with the Federal Power Commission in September. The Cowlitz is a tributary of the Columbia.

The 350-ft. high Mossyrock Dam would create a reservoir with 975,000 acre-ft. of usable storage. Its power plant would have a capacity of 225,000 kw. Usable storage at the 225-ft. Mayfield Dam would be 21,000 acre-ft. It would have a 120,000-kw. power plant. Switchyards at both plants, a transmission line and a substation in Tacoma also are planned.

Layoff of 1,000 Planned by Reclamation Bureau

Layoff of about 1,000 construction workers, most of them on California's Central Valley project, will soon be announced by regional director Richard Boke of the Reclamation Bureau. Workers are being laid off now.

The action comes as a result of a limitation on the number of persons who may be employed by the bureau. The limitation, setting wage and salary funds for such employees at $48,000,000 for the 1949 fiscal year, was contained in the 1949 Interior appropriation bill.

Reclamation, it was pointed out, has ample funds to continue the projects authorized for the year, but must spend them for construction under contract rather than for construction by force account. That accounts for the layoffs. Estimates are that it will take a minimum of 60 to 90 days for advertising of contracts and letting of bids. This period could run as high as six months.

The layoffs come at what could be a strategic time in the presidential campaign. Both candidates recently toured the West, trying to outpromise each other on public works spending.

It was indicated that similar, although probably smaller, layoffs, are being effected in other regions now.

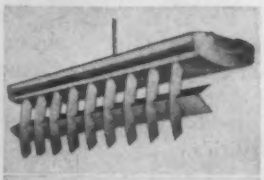
● Bureau of Labor Statistics has issued some figures on 32 industries showing the change in output per man-hour since 1939. The electric light and power industry, with a rise of 67%, was second only to rayon and allied products, which went up 97%. In third place, far behind, was steam railroad transportation. Its output per man-hour rose 35%.

● Hawaiian Electric Co., Honolulu, T.H., has voted to increase its capital stock from $12,000,000 to $15,000,000. The territorial public utilities commission has approved. Hawaiian will issue 100,000 new shares of common stock, and 50,000 new shares of preferred stock, both at par value of $20.

Eye-Q is a new and outstanding development in lighting design — conforming to the highest construction standards, with more "Plus Features" than any unit of its type or in its class, yet is unbelievably low in cost. Write today for full information on Eye-Q, its a natural for schools, stores, offices and institutions.

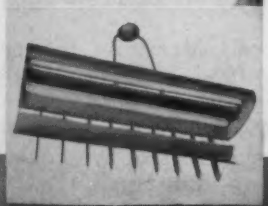
all these OUTSTANDING FEATURES

- Exceptionally high efficiency of 83%
- Hinged Removable Louver — opens from either side and is removable without the use of any holding device
- Guaranteed Ballast — slides along the entire unit
- Versatile Mounting — stems can be inserted at any point on the housing
- Swiveling Side Reflectors — permits cleaning of inside reflectors from the outside without removing the lamps
- Lo-Brite Louver Finish—reduces glare, gives cool, comfortable light
- True Functional Design — gives bonus lighting
- High Light Output with uniform low brightness
- Heavy gauge all steel construction
- Illuminated sides
- Easy Maintenance—Simple Installation



Lo-Brite Finish Louvers — minimize glare, open and hang from either side of unit or can be removed completely. Are positively "snapped" into position without use of springs, screws or holding devices.

Side reflectors swivel out so that inner reflecting surface may be washed or dusted very simply.



Wide wireway for easy maintenance. Sliding ballast permits use of any type hanging stem at any position along the entire unit—whether individually mounted or in continuous rows.

Smithcraft
LIGHTING DIVISION
CHELSEA 50, MASSACHUSETTS

FOR LONGER, TOUGHER, MORE EFFICIENT SERVICE

P. R. MALLORY & CO., Inc.

MALLORY CAPACITORS

Type MSU—AC Motor Starting Capacitor

Manufactured to a standard of quality for which Mallory is famous. Extra long service life and greater efficiency is "built in" to make Mallory Capacitors the ideal replacement for every motor starting application. Top caps, bottom caps and brackets are also available.

FOR QUALITY AND DEPENDABILITY ...SPECIFY MALLORY

Distributed by

INSULATION AND WIRES INCORPORATED

Atlanta 3, Ga. · Boston 20, Mass. · St. Louis 3, Mo. · Detroit 2, Mich. · Houston 3, Texas · Portland 14, Ore. · Los Angeles 21, Calif. · New York 7, N. Y. · San Francisco 3, Calif.

SITTLER COMPANY, Chicago 7, Ill. · H. A. HOLDEN, INC., Minneapolis 3, Minn.

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance — Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resiliant, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

NEMCOITE

Built-Up Mica Products for Every Electrical Insulating Use

FIBER GLASS-MICA FLEXIBLE SHEET INSULATION
PLASTIC BOND TYPE

Used for slot liners, coil wrappers, phase, core, end and splice insulation. Available in sheets 36"x36", thickness from .006" to .025".

Fiber Glass-Mica comprises Fiber Glass Cloth and Mica splittings, bonded with a Flexible Plastic organic resinous binder. It supplements the standard Flexible Mica and Paper or Mica and Cloth products by using a fibrous inorganic glass cloth in place of the organic paper or cloth components, thus extending the usefulness of the insulation to considerably higher temperatures of operation.

"Your Product is only as good as its Insulation"

Manufactured by

NEW ENGLAND MICA CO.

Distributed by

ELECTRICAL SPECIALTY CO.

SAN FRANCISCO, 316 Eleventh St. · LOS ANGELES, 418 E. Third St. · SEATTLE, 2406 First Ave. · PORTLAND, 325 N.W. 6th Ave. · DENVER, 1015 Twenty-first St.

NEWS ABOUT PEOPLE

● PROFESSORS and instructors representing the electrical engineering departments of 26 college and universities in the United States and Canada attended a six-day faculty lighting conference in September at Nela Park, headquarters of General Electric's lamp department in Cleveland, Ohio. Western instructors attending the conference included L. H. Brown, Stanford University; W. C. DuVall, University of Colorado; D. M. Finch, University of California; S. C. Morgan, University of British Columbia, and G. R. Shuck, University of Washington.

● C. M. CUTLER, consulting engineer of Seattle, has been appointed Skagit project engineer for Seattle City Light. With headquarters at Skagit, he will have charge of all electrical work at the new Ross power house with four 90,000-kw. units and of the installation of an additional 60,000-kw. unit at the Gorge plant. He spent from 1920 to 1942 with the General Electric Co.; was a colonel in the army during the war and for the past few years has been in consulting practice in Seattle.

● ROY A. WEHE, consulting engineer has opened offices in San Francisco at 111 Sutter St., Suite 1321. He will handle public utility rates and regulatory matters, industrial studies on fuel and power supplies, utility operations, cost studies, financial reports. Wehe was for many years chief engineer of the California Public Utilities Commission and in more recent years served as assistant director of the Department of Public Utilities.

● VERN C. REDMAN, for the past four years special representative in the office of division manager H. H. Courtright of Pacific Gas and Electric Co., Fresno, is the new sales manager for San Joaquin Power Division of the company, succeeding the late John P. McElroy, who was division sales manager for five years until his death on Aug. 8.

● HOBART C. MCDANIEL, formerly with Pacific Power & Light Co., Portland, has been appointed manager, Technical Press Service in the public relations department of Westinghouse Electric Corp., Pittsburgh, Pa., succeeding Carl E. Nagel, who joined McGraw-Hill Book Co. in New York.

this SHIELD means greater seeing comfort!

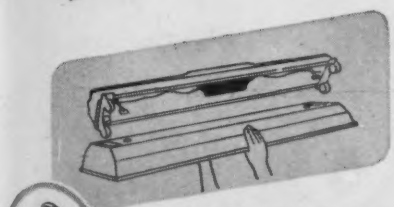
the ANSWER to the latest trend in FACTORY FLUORESCENT LIGHTING!

This most modern method of lighting factories and other work places provides not only the higher lighting levels so essential to efficient production, but also that increased protection from glare and excessive brightness to which employees are entitled.

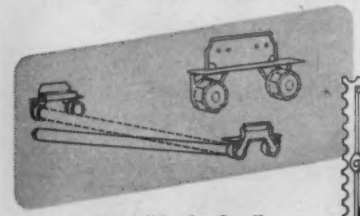
The additional brightness and glare control afforded by the exclusive longitudinal shield in "SHIELD-FLO 40" Units marks a distinct advancement in the trend toward more comfortable seeing conditions. This shield helps to control the brightness of the lighting installation by increasing the shielding of the lamp without materially sacrificing the effective illumination obtained on the horizontal and vertical working surfaces.

This white mat longitudinal shield and many other features of design and construction—such as approved RLM reflector contour and the high reflection and diffusion factors of Benjamin Life-Time Porcelain Enamel—make possible the attainment of high light levels with *greater seeing comfort.* Embodied also in these advanced lighting units are such features as the exclusive Benjamin "Springlox" and "Lok-Latch" constructions, which facilitate re-lamping and maintenance, thus cutting cost and encouraging periodic attention and cleaning.

WRITE for DATA BULLETIN AD-5428 on BENJAMIN "SHIELD-FLO 40" Units. Address: Benjamin **Electric Mfg. Co., Dept. J, Des Plaines, Ill.**



exclusive **"Lok-Latch"** Fasteners lock or unlock reflector with just a quarter turn of the fingers ... no tools required ... no interference with wires or controls.



exclusive **"Springlox"** Safety Type Lampholders. Lamps are installed quickly, without difficulty in positioning prongs ... will not drop out.

BENJAMIN TRADE MARK

"Shield-Flo 40"

Distributed Exclusively Through Electrical Wholesalers

TRIPLOC Plugs and Receptacles

1, 2, 3, 4, 6, 8 pole interchangeable and reversible contact units.

An Exceptionally Versatile Line in the Heavy Duty Field

An exceptionally versatile line, unequalled in the heavy duty field, with a virtually unlimited number of assembly combinations to meet the individual requirements of *any* portable electrical equipment.

Interchangeable contacts, 1 to 8 poles, can be assembled in standard plug shells and receptacle housings. The protected female contact unit can be assembled in either plug or receptacle for safety in the line side of the circuit. Fusible types and units with one pole grounded are also available.

Automatic bayonet lock with either manual or combination manual and automatic release protects equipment and wiring. Wide range of pressed steel plug shells, receptacles, and cord connectors available in the complete Triploc line, including cast metal housings threaded for watertight gasket seal. Ratings up to 20 amperes, 250 volts DC, 460 AC. Consult your Pylet Catalog 1100, Bul. 1140-1, for complete listings.

CONDUIT FITTINGS • FLOODLIGHTS

THE PYLE-NATIONAL COMPANY

1364 N. Kostner Ave., Chicago 51, Ill.

1302 Hobart Bldg., San Francisco 4
Pacific Coast Sales Office

● CLIFFORD V. COONS has been named vice-president in charge of sales and G. M. GREENWOOD has been appointed vice-president and treasurer of Rheem Mfg. Co., it was announced by R. S. Rheem, president. Coons, who joined the company in 1934 as a timekeeper at the Richmond, Calif., plant, rose to manager of the Houston, Texas, plant in 1939, and two years later took over the position of manager of container sales in New York for the firm. Since 1945, he has been general manager of sales. He will continue to make his headquarters in New York. Greenwood, who joined the Rheem company in 1941 as treasurer, was made a member of the board of directors that year. He will continue to be located in the company's San Francisco offices.

● THOMAS MORRIN has been appointed chairman of electrical engineering research at Stanford Research Institute. He was formerly chief of the microwave engineering department of the Raytheon Mfg. Co., Waltham, Mass. Before the war he worked with Westinghouse Electric Mfg. Co., and with Pacific Gas and Electric Co.

● AL DUNCAN has been appointed to succeed Bruce Donaldson as district appliance manager for the Canadian General Electric Co. at Vancouver, B. C. Donaldson has been appointed director of sales training and has moved to the Toronto office of Canadian General Electric.

● A. E. NELSON has become district auditor for the Westinghouse Electric Supply Co., northern California district, with headquarters in San Francisco. He succeeds J. E. SIMPSON, who has been transferred to the north Pacific district, Seattle.

● V. E. DODSON has been appointed assistant to Allen G. Jones, Pacific district manager of the General Electric apparatus department, succeeding C. A. BINNS, who retired. Dodson was formerly in the engineering division of the company at the San Francisco office.

● ROBERT J. HOFFMAN of General Electric Co., has been appointed meter and instrument specialist in San Francisco, according to Allen G. Jones, Pacific District manager of G-E's apparatus department.

● APPOINTMENT of C. T. SPIVEY as director of industrial relations for Columbia Steel Co., San Francisco, has been announced by J. Lester Perry, president. Spivey succeeds JOSEPH L. TURNER, who has been promoted to an executive position with U. S. Steel.

● LESTER WALDIT has been appointed chief electrical inspector for the city of Sacramento to succeed the late Clifford Prud'homme. He has been with the city electrical department there for some years and acted as chief during Prud'homme's illness.

● ROBERT E. NOONAN has resigned as customs collector for San Diego, Calif., to accept a position as assistant to Dan W. Tracy, president of the International Brotherhood of Electrical Workers (AFL).

● APPOINTMENT of D. F. MCCURRACH, assistant general manager of Pacific Power & Light Co., to a new post as assistant vice-president in the rate and research department, with headquarters at Portland, has been announced by President Paul B. McKee.

● JUSTIN M. JACOBS, president of the Benbow Mfg. Co., Redwood City, Calif., has announced the appointment of A. A. Schueler as general sales manager. Schueler recently resigned as general sales manager of the Square D Western division.

C. D. LaMOREE Electrical Insulation

The Spaulding Fibre Company, Inc.
Fibre — Spauldite
Spauldo and Transformer Board

Irvington Varnish & Insulator Co.
Varnish & Varnished Products

The Hope Webbing Company, Inc.
Electric Tapes and Sleevings
Glasflex

Owens Corning Fibreglas Corp.
Fibreglas Tapes, Sleevings and Tying Cords

Dow Corning Corp.
Silicones
Varnish and Motor Insulation

The Macallen Co.
Mica and Mica Products

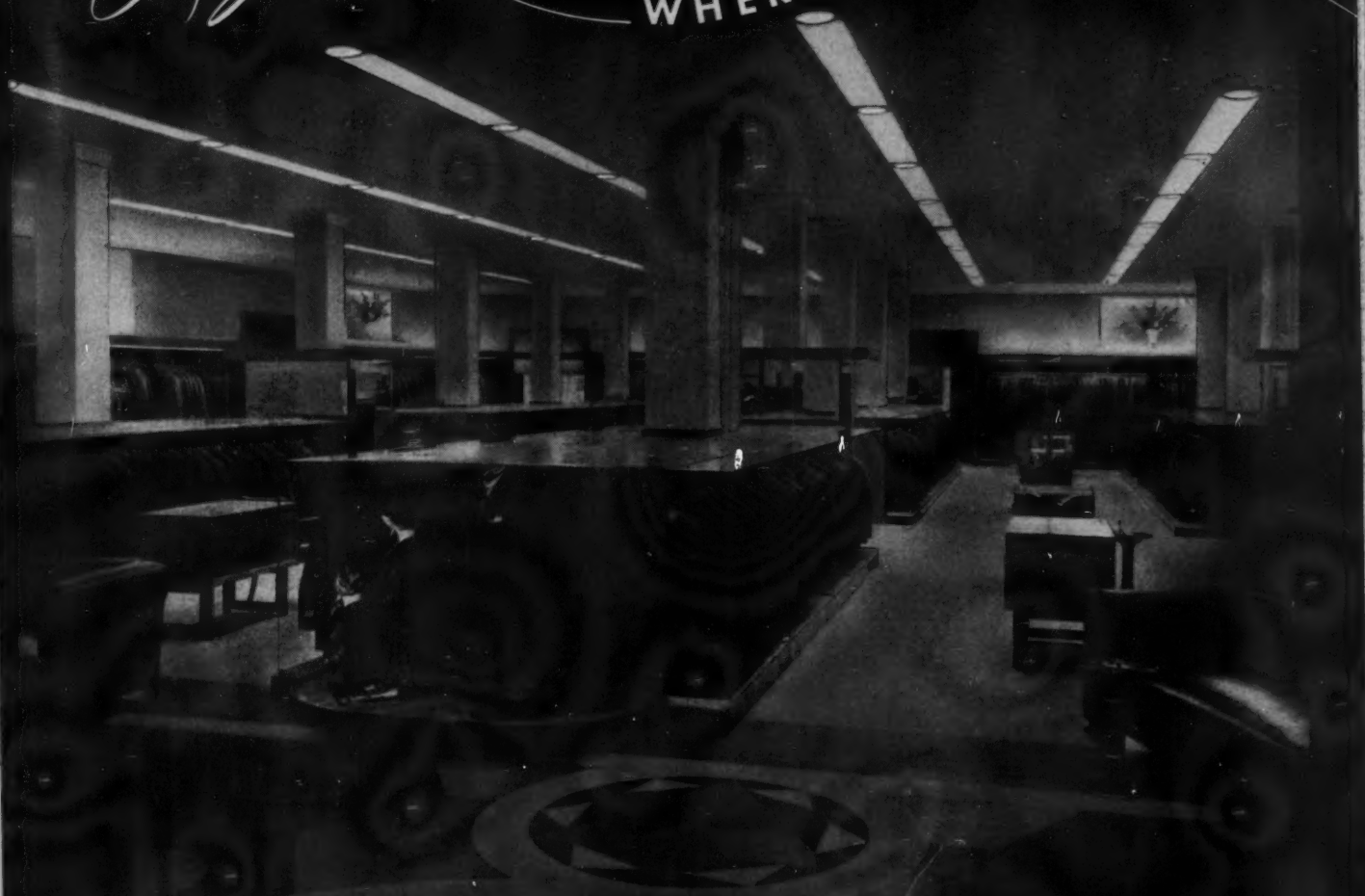
Plaskon Div. Libbey Owens Ford
Moulding Compounds

LOS ANGELES 15
1325 San Julian St.

SEATTLE 1
166 Jackson St.

SAN FRANCISCO 3
1889 Mission St.

THE *Light* YOU WANT..... WHERE YOU WANT IT!



A PERMAFLECTOR PORTRAIT
The Kleinhans Co.
Buffalo, N. Y.

COMPANION FLUORESCENT AND INCANDESCENT UNITS

Detail of Adjustable Incandescent Downlight used in line with the 40-Series Universal Troffers. The new Pittsburgh Permaflector Catalog 48-F lists the complete line of fluorescent troffers, luminaries and companion incandescent units.

"Pittsburgh" Permaflector

Flexible Pittsburgh Permaflector Lighting Equipment gives you full freedom of design in your building and modernization programs. With this scientifically engineered, distinctively styled equipment you create exactly the illuminating results you require.

The complete line of Pittsburgh Permaflector Fluorescent and Incandescent Lighting Equipment meets every interior or exterior installation requirement.

For full particulars on this standard equipment which gives custom lighting results, and detailed illustrations of many application possibilities—send for Catalog 48-F.

PITTSBURGH REFLECTOR COMPANY

OLIVER BUILDING · PITTSBURGH 22, PENNSYLVANIA

MANUFACTURERS OF FLUORESCENT AND INCANDESCENT LIGHTING EQUIPMENT
DISTRIBUTED BY BETTER ELECTRICAL WHOLESALERS EVERYWHERE

Permaflector Lighting Engineers in All Principal Cities

Wakeman

● H. R. WAKEMAN, superintendent of distribution for Portland General Electric, retired Aug. 31 after 41 years service with the company. Wakeman now joins old-timers Coldwell, Osborne, Robley, Searing and others with whom he was associated since 1907.

● W. H. HILL has been elected president of The Hilo, T. H., Electric Light Co., succeeding ALEXANDER J. PORTER, who resigned. Senator Hill, a Republican member of the territorial senate, purchased stock in the corporation last December.

● JAMES G. ROBSON, president and managing-director of Timberland Lumber Co. of New Westminster, B. C., has been appointed a director of the B. C. Power Corp. He succeeds BYRON I. JOHNSON, who relinquished the post when he accepted the premiership of British Columbia.

● H. G. RETHMEYER, Pacific Coast manager for the marine and aviation division of Westinghouse Electric Corp. since 1947, has been placed in charge of the company's transportation sales in the Pacific Coast area. Rethmeyer succeeds W. P. L'Hommedieau, Pacific Coast manager of the central station division for Westinghouse, who will devote his entire time to the central station division.

● COL. RUFUS W. PUTNAM, wartime army engineer for the Los Angeles District, and recently manager at Los Angeles for Kaiser Engineers Inc., has announced the opening of consulting engineering offices under his own name in that city. Associated with him is a group of engineers and scientists including electrical engineers.

● WILLIAM A. BECKER has been appointed Western sales manager of Bendix Home Appliances Inc. He will work with Bendix distributors in Los Angeles, San Francisco and Phoenix, besides supervising distributors in Billings, Denver, Portland, Salt Lake City, Seattle and Spokane with the aid of recently appointed Seattle division manager, Tom M. Hamilton.

● JOHN C. VAN GROOS, Los Angeles, has been appointed field engineer for the Shallcross Mfg. Co., Collingdale, Pa. His territory will cover the states of California, Nevada, and Arizona.

Deaths

● WILLIAM B. SAWYER JR., 62, assistant general manager of sales of Columbia Steel Co., recently died at his home in Alameda, Calif., after a long illness. In 1911 Mr. Sawyer went to work for General Electric Co. in San Francisco as a salesman. Three years later he joined United States Steel Products Co., subsidiary of United States Steel Corp., as a salesman in the wire products department. In 1930 he was promoted to assistant manager of sales of his department. When United States Steel Products Co. was merged with the Columbia Steel in 1930, Mr. Sawyer became manager of sales, wire products department, and four years later was promoted to assistant general manager of sales, the position he held at the time of his death.

● CARROL D. HEPLER, 43, general manager of the constructional materials department for General Electric Co., died Sept. 22 while visiting a G-E plant in New Kensington, Pa. Vice-president of Trumbull Electric Mfg. Co. until his transfer last May, Mr. Hepler was born in Seattle, joined Trumbull in 1929 as manager of the Seattle plant. He became vice-president of the Pacific division in 1933 and in 1946 was transferred to Plainville, Conn., in charge of manufacturing at all Trumbull plants.

● PAUL J. DENNINGER, retired Whittier district manager of Southern California Edison Co., died of a heart attack Sept. 12. He had been with the company 44 years.

● GEORGE GREGORY, 54, of Eatonville, Wash., assistant chief engineer for the Washington State Public Utilities Department, died Sept. 3. Born in Salt Lake City, he had lived in Seattle before moving to Eatonville eight years ago.

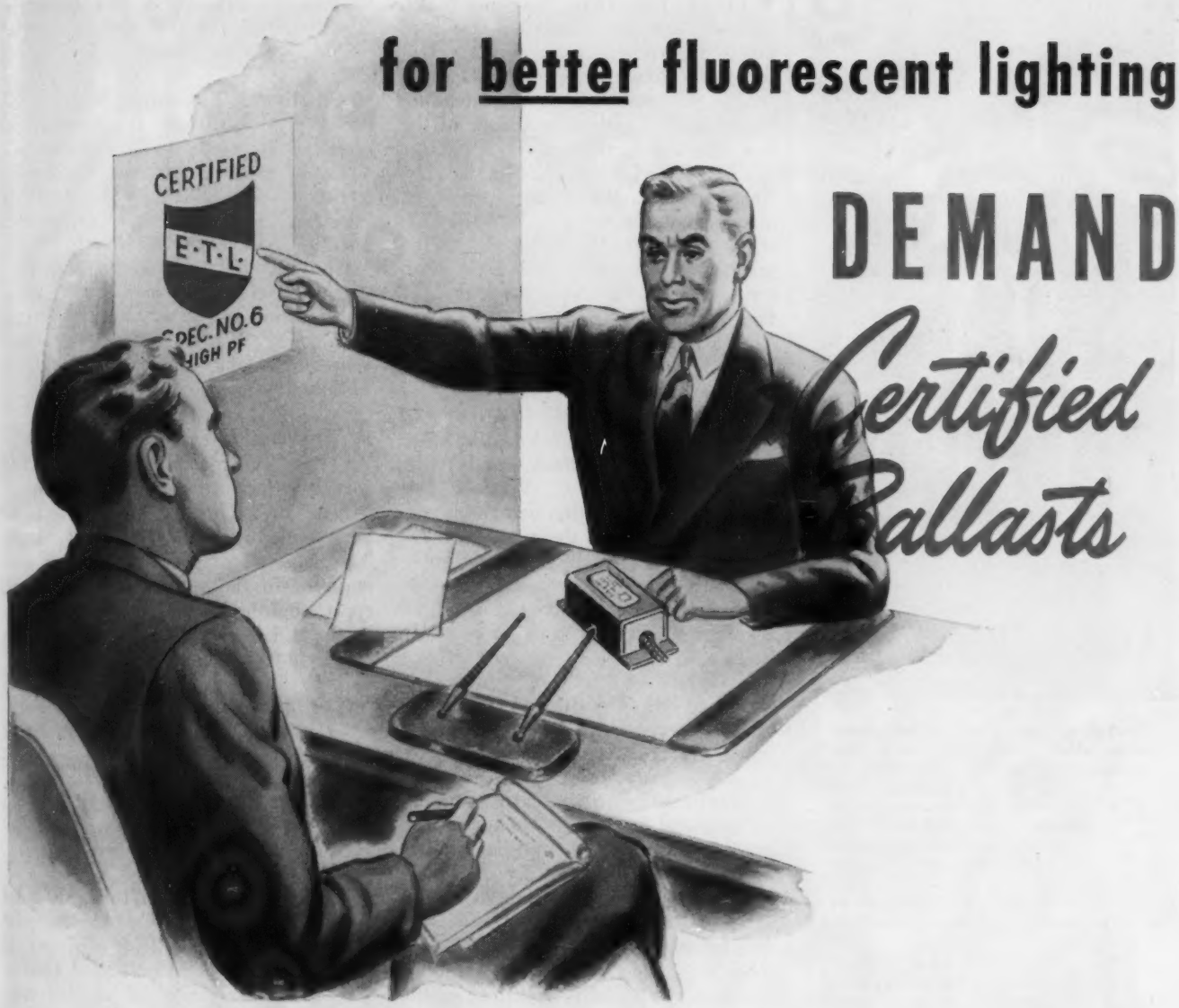
NOTES ON THE TRADE

● NEW PREMISES of the Canadian General Electric Co. Ltd. at 1095 W. Pender St., Vancouver, B. C., were officially opened recently. The new warehouse, showroom and offices adjoin the old building, which has been remodeled. Service and sales departments are located on the ground floor with 20,000 sq. ft. of office area on the second floor. The Vancouver headquarters are under the management of C. A. Morrison, who has been with the firm for 18 years. The four main departmental managers on his staff include S. E. Erskine, manager of the apparatus division; L. A. Duncan, appliance manager; F. R. Barnsley, supply manager, and W. J. Lind, manager of the lamp division.

● I-T-E CIRCUIT BREAKER and its subsidiary Railway & Industrial Engineer Co. opened a factory sales office in the Denham building, Denver, Colo., recently. Ralph G. Lockett, for many years chief application engineer for I-T-E, will manage the office. In addition, he will act as regional supervisor for the eleven Western states, embracing I-T-E and R&IE sales offices in Salt Lake City, Albuquerque, El Paso, Los Angeles, San Francisco, Portland and Seattle. Lockett is well known on the Pacific Coast through frequent appearances before AIEE sections. He is a graduate of Ohio State in the class of 1916. After serving in World War 1, he joined the Cutler-Hammer organizations, leaving in 1937 to become associated with I-T-E.

Lockett

for better fluorescent lighting



DEMAND *Certified Ballasts*

• When you demand and insist on Certified Ballasts in fluorescent lighting fixtures—you're protecting your own best interests—as well as the users'.

Everyone benefits by using Certified Ballasts because they assure . . .

Full lamp life **Rated light output**
Quiet operation **Dependable performance for fixture life**

Strict specifications control the building of every Certified Ballast—Electrical Testing Laboratories, Inc., an impartial judge, then checks and tests them. You're surer of satisfaction with Certified Ballasts.

Certified BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO

Through a close control of the current surge which results from low or momentary high overload, PIERCE Fuses keep your production line humming. No unnecessary shutdowns . . . no lost labor time . . . no production sag, when PIERCE Fuses are in your plant!

Here's how PIERCE Fuses produce cost-saving Surge Control:

BALANCED LAG LINK—creates more lag at low overloads—where it is necessary and harmless; gives SAFE lag at high overloads.

SCREEN VENTILATION—takes in cool air and allows escape of heat and gases, reducing unnecessary fuse blowing and banishing dangerous "afterblow".

Western Representatives:
NORTHWEST SALES CO.
1603 N.W. Johnson St.
Portland 9, Oregon

SLAYBAUGH-THOMPSON CO.
617 Gilpin Street
Denver 3, Colorado

PACIFIC ELECTRO SALES, INC.
1045 Bryant St., San Francisco 3, Calif.
2038 Bay St., Los Angeles 21, Calif.
3401 4th Ave. South, Seattle, Wash.

● CROUSE-HINDS Co., Syracuse, N. Y., held an exhibit of its new developments in airport lighting equipment at the Clift Hotel in San Francisco recently. Crouse-Hinds people attending included H. E. Riggs, manager of the Los Angeles territory; W. R. Major Jr., San Francisco; R. N. McCabe, Los Angeles; H. L. White, divisional sales manager of the West Coast and Chicago territory; G. R. Topham Jr., manager of the San Francisco territory, and A. H. Clarke, manager of the illumination department in New York.

● ENGINEERING and SALES Staff of Westinghouse Electric Corp., Los Angeles, has moved into a new office building at 600 St. Paul Ave. At the same time Walter G. Willson, Los Angeles manager of the firm, announced the next step in the company's expansion program will be a new apparatus and lamp warehouse in the central manufacturing district at 46th and Soto St., which is expected to be ready by Nov. 1.

● JAMES H. MCCULLOCH has been named development and research engineer for Sunbeam Lighting Co., Los Angeles. After doing graduate work at Stanford University he was appointed technical director at Memorial Hall in Palo Alto. McCullough has worked on spot and flood light design for installations in the San Francisco area.

● APPOINTMENT of Arizona Hardware Co., Phoenix, as exclusive distributors of Admiral radios, radiophonographs, television sets, electric ranges and refrigerators for Arizona, has been announced by W. C. Johnson, general sales manager of Admiral Corp.

● ELECTRICAL INDUSTRIES LTD., with registered offices at 550 Cambie St., Vancouver, B. C., was recently incorporated. The firm was capitalized at $50,000 and is authorized to engage in the manufacture and distribution of electrical appliances.

● FORMAL OPENING of Columbia Steel Co.'s new steel sheet and tin plate mill at the Pittsburg, Calif., plant will be marked by a dedication ceremony on Oct. 21, it was announced by J. Lester Perry, president of this Western subsidiary of United States Steel Corp.

● GIVEN MFG. Co., manufacturers of Waste King pulverator, Los Angeles, has announced the appointment of William L. Maas as district factory manager for northern California and western Nevada. Maas was formerly business and sales manager of Pacific Sound Equipment Co.

● ON SEPT. 1 George Magnes of Agencies Co., factory representatives, Los Angeles, announced the following changes in the northern California territory. The firm has moved its sales and engineering offices to 288 7th St., San Francisco, with R. H. Fisher in charge. In the northern California area Agencies Co. represents Narragansett Wire Co., O. Z. Electrical Mfg. Co., Wittie Mfg. Co., and Wheeler Insulated Wire division of The Sperry Corp.

● WESTERN APPLIANCE CORP., Denver, has been appointed a distributor for Duo-Therm Division of Motor Wheel Corp., Lansing, Mich. The Denver company will represent Duo-Therm in all of Colorado except five counties in the southwestern section, eight counties in southeastern Wyoming, and five counties in southwestern Nebraska.

● OWNERS of the A-1 Sales and Service, Spokane, with a store at N622 Monroe St., have taken a lease on additional quarters at the downtown corner of Sprague and Howard Sts. in Spokane. The building will be installed with a model kitchen.

● D. GORDON CLIFFORD, formerly chief engineer of Industrial and Commercial Electronics, is now field engineer at Lenkurst Elecrtic Co., San Carlos, Calif., manufacturers of carrier telephone and telegraph equipments.

● FOWLER MFG. Co., Portland, has announced that it will use Nash-Kelvinator distribution in Oregon and Washington effective immediately for its line of electric water heaters.

● JACK COYL, formerly with Seigal Distributing Co. of Vancouver, B. C., has established the Westview Radio in the Trombley Bldg., Westview, B. C.

● BILLINGS WHOLESALE RADIO, with office and warehouse at 2232 Tulare St., Fresno, has been appointed a distributor for Emerson Radio & Phonograph Corp.

● F. N. WARDWELL has been named Pacific Northwest representative for Essex Wire Corp., with headquarters in Portland.

● C. S. BETTINGER, Western sales manager of Philco Corp., was recently in Honolulu to conduct Philco dealer meetings.

Going-up *with* FEDERAL Cell-Ceil* INSTALLATIONS

Introduction of this colorful, decorative lighting treatment is bringing an unprecedented volume of inquiries from potential lighting customers. You can cash in on this interest *now* for Federal Cell-Ceil is available for *any size job.*

The simple sturdy hanging mechanism for Cell-Ceil makes installation easy for the contractor—gives the lighting customer quick results. It's easier to sell Cell-Ceil, for quick completion of jobs can be assured.

Cell-Ceil is available in harmonious decorator colors. Made of Acme Galva-Bond Steel**, the sections cannot warp. Cell-Ceil sections match perfectly . . . hide ceiling pipes—sprinkler heads—ventilating ducts . . . yet provide easy access for relamping and cleaning.

Architects, designers, and building interests are being told about Cell-Ceil every month in:

Architectural Forum — **Progressive Architecture**
Architectural Record — **Interiors**

If you have not received the Cell-Ceil Technical Bulletin on installation techniques, mail the coupon today for your copy.

*Trade Mark "Cell-Ceil" applied for.
**T.R. Acme Steel Co.

FEDERAL ENTERPRISES, INC.
FORMERLY: FEDERAL ELECTRIC COMPANY, Inc.
8700 SOUTH STATE ST. • CHICAGO 19, ILLINOIS

COUPON

Dept. CCT-4
Federal Enterprises, Inc.
8700 S. State St., Chicago 19, Ill.

Please send your Cell-Ceil Technical Bulletin on installation techniques.

NAME _____ POSITION _____
FIRM _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., required by the Act of Congress of August 24, 1912, as Amended by the Acts of March 3, 1933, and July 2, 1946 of Electrical West, published monthly at Los Angeles, Calif., for October 1, 1948.

County of San Francisco } ss.
State of California }

Before me, a notary in and for the State and county aforesaid, personally appeared George C. Tenney, who, having been duly sworn according to law, deposes and says that he is the Editor of the Electrical West, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semiweekly or triweekly newspaper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations), printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, McGraw-Hill Company of California .....68 Post Street, San Francisco 4, Calif.
Editor, George C. Tenney .....68 Post Street, San Francisco 4, Calif.
Managing Editor .....None
Business Manager, John W. Otterson .....68 Post Street, San Francisco 4, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

McGraw-Hill Co. of Calif., San Francisco; McGraw-Hill Publishing Co. Inc., New York City; James H. McGraw, Jr., New York City; Curtis McGraw, New York City; George C. Tenney, San Francisco, Calif.; John W. Otterson, San Francisco, Calif.; N. A. Bowers, San Francisco, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is..... (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

GEORGE C. TENNEY, Editor.

Sworn to and subscribed before me this 28th day of September, 1948.

(Seal) FRANK A. FLYNN,
Court Commissioner of the City & County of San Francisco, State of California.

ILSCO
Electrical Connectors

MANY TYPES AND SIZES
WRITE for 54-page illustrated catalog.

Western Representatives:
Electrical Specialty Co. Seattle—San Francisco
Strieby & Barton, Ltd. Los Angeles

ILSCO COPPER TUBE & PRODUCTS, Inc. CINCINNATI, OHIO

PERFECT CONTACT
+GOOD FUSES
=PEAK
PRODUCTION

Try This Famous TRICO Trouble-Saver Combination Today.

This Famous TRICO
Combination
"Powder-Packed" Renewable Fuses & "Kliplok" Clamps, Insures peak production and THREE TIMES THE SERVICE

Because

TRICO FUSES Give:
- Guaranteed Results
- Tamper-proof Protection.
- Low Resistance Contacts.
- Safe Time-lag.
- Link Support.
- Life-time Outer Parts.
- Link Protection.

"KLIPLOKS" Reduce:
- Premature Fuse Blowings.
- Unnecessary Shutdowns
- Lost Production.
- Wasted Kilowatts
- Unnecessary Repairs.
- Fire & Accident Hazards.
- "Doubling-up" Fuse Links.

Write For Bulletins Nos. 1&6

TRICO FUSE MFG. CO. Milwaukee, Wisconsin

● BIDDLE TRADE BUREAU Ltd. hopes to move by the end of the year into a new home of its own at the southwest corner of Beverly Blvd. and Union Place, about a mile from the city hall in Los Angeles. There it will have a two-story building containing about 18,000 sq. ft. to house its offices, conference rooms, and its publication facilities for the pricing services that it renders industries. Parking space for 25 cars is to be provided. Offices are now located in the Rowan Bldg. in Los Angeles.

● G. H. WHALE, ARTHUR HORSLEY and ROBERT RAMSAY have established the Modern Electric at Salmon Arm, B. C. The firm is handling electrical appliances and also engaging in appliance repair and service work, and electrical contracting.

● BENJAMIN ABRAMS, president of Emerson Radio & Phonograph Corp., has been on an extended vacation trip to California, visiting Emerson Radio Co. of California at San Francisco, and Century Distributing Co. at Los Angeles, distributor of Emerson products.

● THE AMERICAN BRASS AND COPPER SALES Co., Oakland, has been named a distributor for special aluminum mill products manufactured by the Reynolds Metals Co.

● FRED J. MACFEE has recently been appointed sales manager for the S & M Lamp Co. of Los Angeles.

DIRECTORY ADDITIONS

CRESCENT INSULATED WIRE & CABLE CO., Trenton, N. J.—F. C. Scharr, 251 Central Bldg., Seattle (representing Oregon, Washington, Idaho.)

MILLER EQUIPMENT CO., Franklin, Pa.—Davis Emergency Equipment Co., 1246 Howard St., San Francisco; Neep Equipment Co., Broadway, Portland; Safety & Supply Co., 115 Blanchard, Seattle.

VICTOR ELECTRIC PRODUCTS INC., Cincinnati, Ohio—O. B. Wilt, 1355 Market St., San Francisco.

DIRECTORY OF WESTERN REPRESENTATIVES

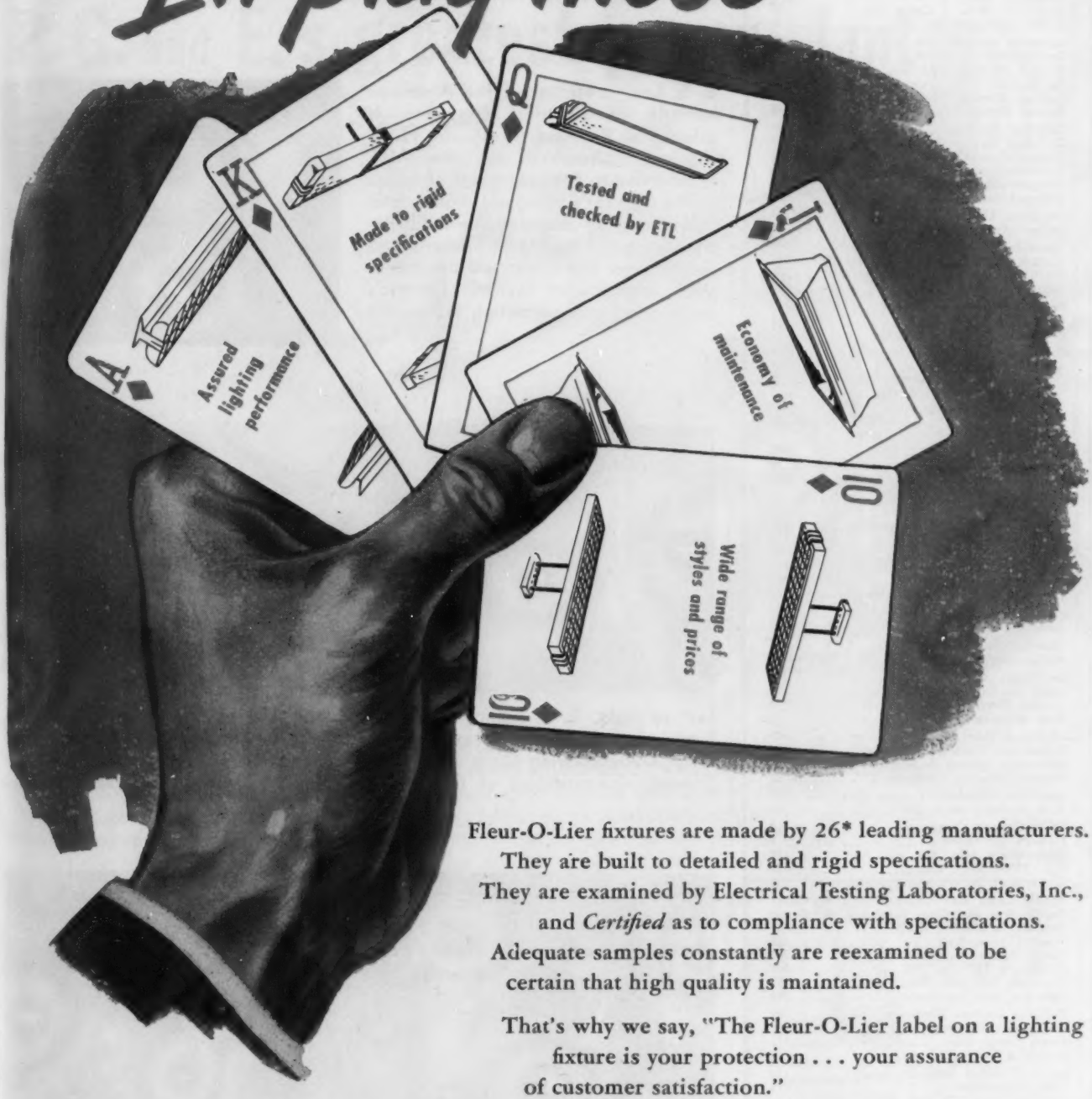
LOS ANGELES. Marsden-Stawn, 260 E. 31st St.

PORTLAND: Neep Equipment Co., Broadway.

SAN FRANCISCO: O. B. Wilt, 1355 Market St.; Detsch & Co., 341 10th St.; Davis Emergency Equipment Co., 1246 Howard St.

SEATTLE: Safety & Supply Co., 115 Blanchard; F. C. Scharr, 251 Central Bldg.

"I'll play these"


Assured lighting performance
Made to rigid specifications
Tested and checked by ETL
Economy of maintenance
Wide range of styles and prices

Fleur-O-Lier fixtures are made by 26* leading manufacturers. They are built to detailed and rigid specifications. They are examined by Electrical Testing Laboratories, Inc., and *Certified* as to compliance with specifications. Adequate samples constantly are reexamined to be certain that high quality is maintained.

That's why we say, "The Fleur-O-Lier label on a lighting fixture is your protection . . . your assurance of customer satisfaction."

*Participation in Fleur-O-Lier is open to any manufacturer wishing to qualify. Consequently, the number of Fleur-O-Lier manufacturers is increasing constantly.

FLEUR·O·LIER

Manufacturers

2116 Keith Building • Cleveland 15, Ohio

Fleur-O-Lier is not the name of an individual manufacturer, but of a group of fixtures made by leading manufacturers. Participation in the Fleur-O-Lier program is open to any manufacturer who complies with Fleur-O-Lier requirements.

INDEX TO ADVERTISERS
October 1948

Allis-Chalmers Mfg. Co...13, 26, 65, 124, 125
All-Steel Equipment, Inc.... 33
Aluminum Company of America.... 37
American Steel & Wire.... 8, 9
Anaconda Wire & Cable Co.... 35
Austin Company, M. B.... 16

Benjamin Electric Mfg. Co.... 145
Brewer-Titchener Corp.... 12
Briegel Method Tool Co.... 115
Buckingham Mfg. Co., Inc.... 36
BullDog Electric Products.... 51
Burndy Engineering Co., Inc.... 47

Certified Equipment Mfgrs. Starters.... 32
Certified Equipment Mfgrs. Fixtures.... 149
Chance Company, A. B.... 42, 43
Condon Company, Earl S.... 136
Copperweld Steel Co.... 55
Crescent Ins. Wire & Cable.... 27

Day-Brite Lighting, Inc.... 54, 141
Driver Harris Company.... 58

Electric Equipment Company.... 128
Electrical Engineers Equipment Co.... 66
Electrical Specialty Company.... 144
Everstick Anchor Co.... 144

Federal Enterprises, Inc.... 151
Fleur-O-Lier Mfgrs. Co.... 153
Four-Wheel Drive Auto Co.... 29

G & W Electric Specialty Co.... 50
General Electric Company:
Bridgeport, Construction Div.... 49
Cleveland, Lamp Division.... 137
Schenectady, Apparatus Division.... 1, 4, 5, 20, 21, 31, 58
General Electric Supply Corp.... 107
Graybar Electric Co., Inc.... 117

Helwig Company.... 128
Honn Company, George E.... 140
Hubbard & Company.... 63
Hughes Brothers.... 14

Ilsco Copper Tube & Products.... 152
Ideal Industries, Inc.... 138
Indiana Steel & Wire.... 44
Industrial Electronics Corp.... 140
Insulation & Wires, Inc.... 48, 144
Irvington Varnish & Insulator Co.... 30

Jeffries Transformer Company.... 138
Johns-Manville.... 24, 25, 113

Kearney Corp., James R.... 59
Kerite Company, The.... 19

La Moree, C. D.... 146
Lapp Insulator Co. Inc.... 46
Leader Electric Company.... 7
Line Material Company.... 3

Matthews Corp., W. N.... 142
Mineralac Electric Company.... 140
Minnesota Mining & Mfg. Co.... 40
Moloney Electric Company.... 56, 57

National Telephone Supply Co.... 53
New England Mica Co.... 144

Ohio Carbon Company.... 60
Okonite Company.... 6
Orangeburg Mfg. Co. Inc.... 123
O.Z. Elec'l Mfg. Co.... 121
Ownership Statement.... 152

Pacific Coast Elec'l Association.... 4th Cover
Pacific Gas and Elec. Company.... 3rd Cover
Penn-Union Electric Corp.... 62
Pieper-Lillard, Inc.... 126
Pierce Renewable Fuses, Inc.... 150
Pittsburgh Reflector Co.... 147
Porcelain Products, Inc.... 52
Pyle National Company.... 146

Reliable Electric Company.... 109
Rockbestos Products Corp.... 127
Rome Cable Corp.... 111
Russell & Stoll Co. Inc.... 136

H. B. Sherman Mfg. Company.... 134
Shell Oil Company.... 119
Simplex Wire & Cable Co.... 22
Smithcraft Lighting.... 143
Smoot-Holman Company.... 122
Southern California Edison Co., Ltd.... 2nd Cover
Spang-Chalfant Div., National Supply.... 41
Square D Company.... 131
Standard Oil Company.... 61
Sunbeam Lighting Company.... 139
Sylvania Electric Products, Inc.... 135
Thomas & Sons Co., R.... 23
Topflight Tape Company.... 128
Tork Clock Co., Inc.... 54
Trico Fuse Mfg. Co.... 152
Union Pacific Railroad Company.... 34
United States Rubber Company.... 15
United States Steel Corp.... 8, 9
Van Luven, H. H.... 138
Victor Insulators, Inc.... 134
Wagner Electric Corp.... 129
Westinghouse Electric Corp.:
Bloomfield, Lamp Division.... 132, 133
Pittsburgh, Apparatus.... 10, 11, 17, 18, 28, 38, 39, 45

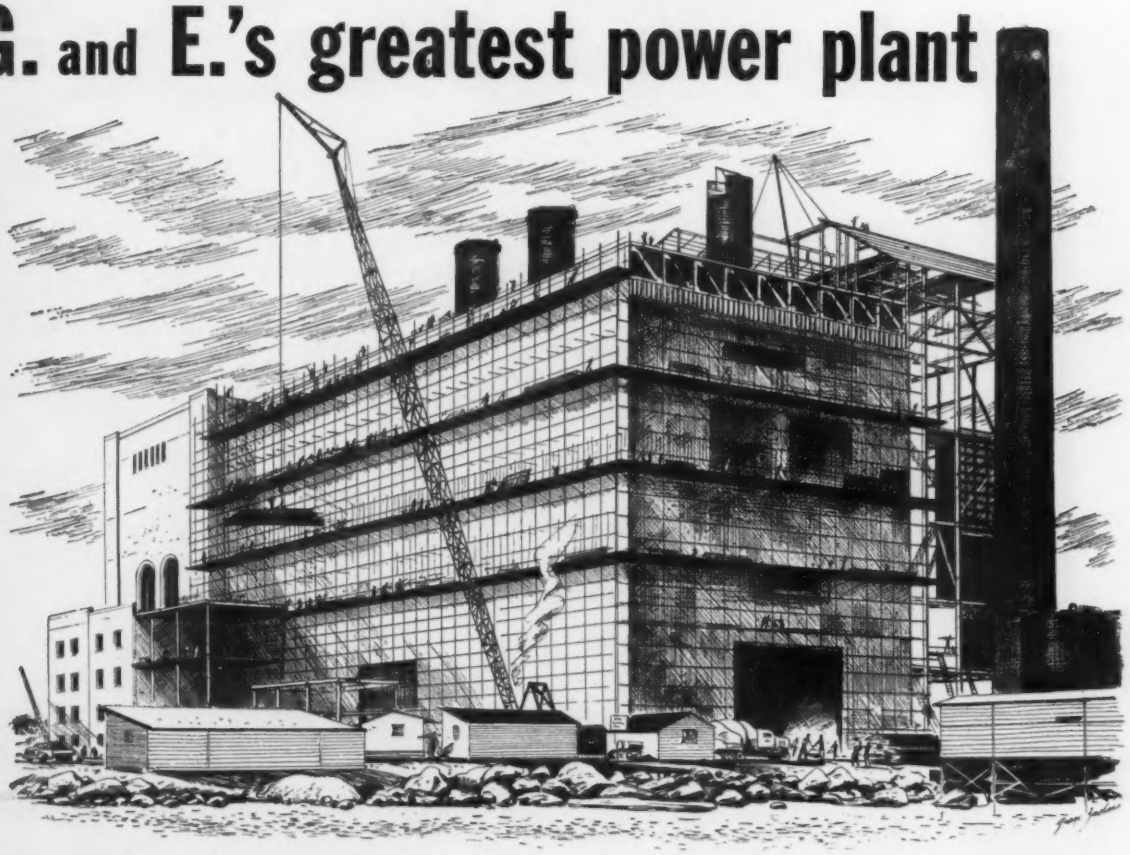
PROFILES

E. S. Lee, president of the American Institute of Electrical Engineers, is greeted at Richland, Wash., by H. R. Hughes, chairman of the new AIEE chapter there. Lee was guest of honor at the chapter's inaugural dinner, and following it he attended the AIEE Pacific General Meeting in Spokane and visited other Northwest sections. He is chief engineer of General Electric's engineering and consulting laboratory

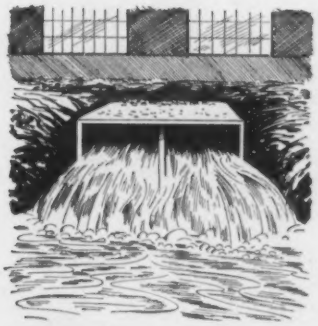
Left to right, E. J. Rising, manager of radio and appliance sales, California Electric Supply Co., San Francisco; R. C. Cosgrove, executive vice-president of Avco Manufacturing Corp. here on a recent visit to the West; and E. C. McDonnell, vice-president of California Electric Supply company, San Francisco

Recently Westinghouse Electric Supply Co., Spokane, played host to about 500 dealers and guests at the opening of its new $175,000 warehouse and office building located at Monroe and Gardner Ave. Among the territory salesmen who attended were (standing left to right) Ross McConnell, Seattle; Paul Carlson, Seattle; L. D. Pulsifer, Seattle; Leo Fernandes, Seattle; D. M. Grace, Butte; Fred Luithle, Seattle; Earl McBratney, Tacoma; J. L. Walker, Seattle; Burt Wiegenstein, Seattle; Ralph Sroufe, Portland; H. L. Vincent, Spokane manager; J. R. Wells, Yakima, H. E. Bailey, Seattle. Seated, W. M. Jewell, Seattle, North Pacific district manager, and D. M. Salsbury, New York president of WESCO

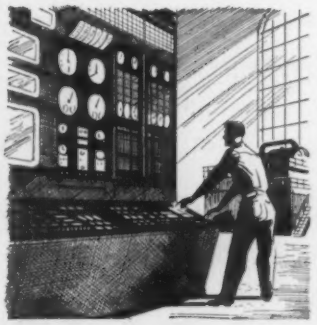
1000 men rush expansion of P. G. and E.'s greatest power plant



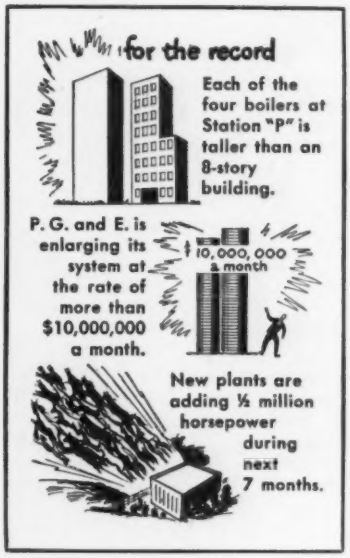
Near the lapping waters of the Bay at Hunters Point in San Francisco, P. G. and E.'s Station "P" is rapidly growing from a good sized power plant into a giant with an electric generating capacity of 360,000 horsepower. When the new power goes on the line this winter, Station "P" will be the largest generating plant on P. G. and E.'s vast system. And it's just part of our postwar construction program which is adding nearly 2,000,000 horsepower to our power supply.



We put salt water to work at Station "P." Two tunnels, six by nine feet, will pour 230,000,000 gallons of Bay water daily through the plant to cool the steam from the turbine-generators. That's nearly three times as much water as San Francisco uses every day.



When Station "P" hits its maximum output, it will produce six times as much electrical power as it does today. Still other plants, both steam and hydro, are on the way to provide more power for Northern and Central California homes, farms and factories.


for the record
Each of the four boilers at Station "P" is taller than an 8-story building.
P. G. and E. is enlarging its system at the rate of more than $10,000,000 a month.
10,000,000 a month
New plants are adding ½ million horsepower during next 7 months.

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

EW-110—1048

SAN JOAQUIN DREAM HOUSE

FRESNO

Scheduled to be open for public inspection throughout the month of November is this Fresno Dream House of Electriliving. To thousands of Fresnans and those who make Fresno their buying center, this two story colonial manor will impressively display modern lighting and wiring and all the latest electrical comforts and conveniences. Electrical equipment to be installed includes range, dishwasher, garbage disposal unit, water heater, refrigerator, home freezer, automatic washer and dryer, ironer and complete air conditioning. Model homes dramatically sell "dream installations." Use them in your selling while impressions are strong with your sales prospects.

PACIFIC COAST ELECTRICAL ASSOCIATION

447 SUTTER ST., SAN FRANCISCO 8 • 601 WEST FIFTH ST., LOS ANGELES

ADEQUATE WIRING Certified